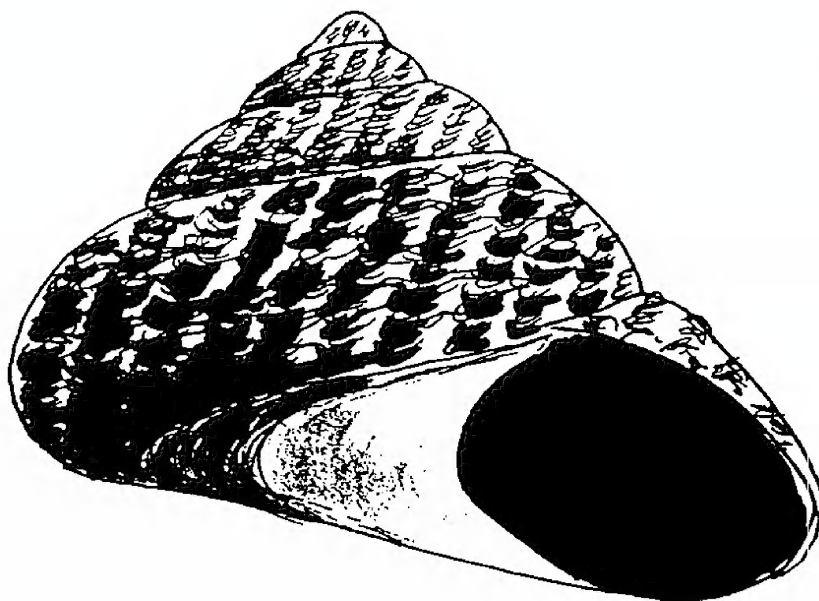


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IMPRESSIONS OF THE CHATHAMS

By Pat Lakeman

[This article is based on a story of the same title which first appeared in *The Chatham Islander* community newspaper on 8 July 1997.]

You sometimes hear that the Chatham are barren islands - and our first trip from the airport to Waitangi doesn't do much to contradict that. On this grey, bleak sort of day in March the bracken dominates the view of a narrow, mostly flat strip of land between Te Whanga Lagoon and the sea to the west. It's got something though - I come to like the stark coastal landscapes, as well as the soft gold beaches of Hanson and Petre Bays that stretch far into the distance on a sunny day. A young man who travelled from the airport with us said he'd been away "in New Zealand" for four days and couldn't wait to be back. I understood that a bit better by the end of my ten day visit.

Three of us had come to visit - Tracey, Jenny, and Pat. For Tracey and Pat, it was a bit of New Zealand we hadn't seen before, and for all of us it was a chance to take a holiday in a place which has some interesting sea shells to find. Tracey is also interested in the island flora, by virtue of her wider interest in horticulture and New Zealand natives in particular.

We stayed at Roo's Roost Backpackers in Waitangi. An earlier guest had described it in the visitors' book as the best backpackers' accommodation in New Zealand - I think you could stretch the net wider and that would still be true. Photos in the lounge showed the extensive renovations that had been done in 1996 - and we enjoyed the whole house to ourselves for all but one night of our stay.

A Mazda station wagon from Chatham Rentals provided reliable transport to take us to most parts of the island. Two punctures in one day could have been a bit of a test, but luckily the second didn't show up until we had reached home at the end of our day. Our interest in shells focused us on accessible parts of the coast - and, wet or fine, we were seen by local residents trekking the coastline around Waitangi, at Owenga. Taupeka Point. Matarakau, Kaingaroa, Okawa Point, Port Hutt; and some of those places more than once! We appreciated the generous way that local people allowed us to cross their property whenever we needed access to the coast - and it was also nice to meet people in this way whom we might not otherwise have met at all.

On one of these occasions it proved to a very small world. On our way to Kaingaroa we were talking about not having been out to catch any fish yet, and no fresh fish being available at the local shop since local people don't need to buy any! We thought we'd ask if there was any fish for sale at the Kaingaroa factory and, who knows, they might even have sea shells around as well! In our usual way we introduced ourselves to the first person we saw, and talked about our visit and our interests. After mentioning shells we were asked, did we happen to have known Peter Jamieson? Well we certainly did; we told how Peter had been a past president of the Wellington Shell Club and close friend of Jenny and Pat through many shell collecting expeditions, plus much of the preparation for the 1995 National Shell Show in Wellington. And that, sadly, Peter had died not long before the Shell Show took place, and that many shell collectors around the country still miss him greatly. It turned out we were talking to Alan Jamieson, Peter's cousin, and that Peter's brother Gary had been visiting only about two weeks earlier. It was just great to meet Alan, and we left Kaingaroa with gifts of delicious fish, spiky *Poirieria zelandica* shells and double scallop shells, and a box of cod fish remains after the meat had been filleted off. Not everyone would be delighted with the last item, but cod eat stones and shells for ballast in rough weather, so rummaging through cod guts can produce some interesting shell finds (yes, you have to be dedicated, ours is not a hobby for the squeamish!)

After a few days it seemed that most people knew who we were - and we had begun to take it for granted that nearly everyone we met was related somehow to nearly everyone else! This creates a very friendly atmosphere but doesn't prevent some keen competition - we visited the Chatham Islands Hotel on Friday night when a touch rugby game had just finished. This was like the best of occasions in any New Zealand pub, say on the West Coast - lots of friendly people, good value meals piled high on the plate, pool table, darts board, TAB, hardworking bar staff, and a warm noisy atmosphere. It isn't easy to drag yourself away.

On the first day after our arrival, the Chathams experienced the tail of Cyclone Gavin and we watched rain blast from one side of the island to the other, seemingly without touching the ground. We went out anyway, since for all we knew our whole stay could have been much like that. We didn't meet many people out that day! In fact, the weather was mostly kind to us and we filled every day with outdoor activities. As well as much shell hunting we visited the stone mission cottage at Maunganui, Tome ("Tommy") Solomon's statue beyond Owenga, Blind Jim's Creek, the Nikau Bush conservation area, and the Hapupu historic reserve. We did catch fish and collect paua to eat. We went south only a bit beyond Point Durham, and we didn't get offshore to Pitt Island, but that just leaves us with some new things to do when we visit next time!

For shell collecting, there are lots of great locations. You have to have a car to get around but distances are not far. I had spent time at home identifying the species which are endemic to the Chatham Islands (about 36, and most of them gastropods), as well as locations I might find them at - in the hope of increasing my chances of bringing some home. I think it helped!

While there, Jenny mapped the shells we found against the records in *Cookia* from past Wellington Shell Club collecting trips. The highlight of our collecting for me was finding live *Cominella nassoides iredalei* (at Owenga) but I was also particularly delighted with -

- * *Cellana strigilis chathamensis* (several locations, including Waitangi);
- * *Cantharidus opalus cannoni* (several locations, including Taupeka Point);
- * *Chlamys zealandiae* (beautifully coloured, freshly washed up in sponge at Okawa Point and Owenga);
- * *Haliotis virginea morioria* (mainly at Owenga);
- * *Buccinulum vittatum bicinctum* and *B. linea linea* (several locations, including Okawa Point);
- * *Calliostoma pellucidum* (live at Owenga).

We were lucky to strike a rich wash-up at Owenga at the end of our stay, and good quantities of *Modelia granosa* and *Cookia sulcata* washed up live on Waitangi Beach. Shell sand at Owenga was a good source of interesting tinies, and racked up craypots proved often to be worth a look!

Only at the airport on our way home did we find out that there is a monthly newspaper, by meeting Lea Clough who asked us to write an article. We enjoyed our visit a lot, found some great new shells for our collections, and left while we still have reasons to go back.

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CHATHAM ISLAND: BEACH AND LOW TIDE SHELL LIFE

By Jenny Raven

Between 8 to 17 March 1997, three Wellington shell club members, Pat Lakeman, Tracey Newman and Jenny Raven visited Chatham Island some 800 km. east of mainland New Zealand. This trip covered fairly much the same areas as the 1994 Wellington Shell Club trip but this time concentrated on being at each locality for the low tide and making an in-depth record of the molluscs seen living there.

Although no new species were added to the Chatham Islands check list compiled by John Marston following the 1994 trip and recorded in *Cookia* Vol.7 no. 3 some interesting live observations were noted and the abundance or otherwise of specimens seen was recorded. These results and observations are given in the following tables. A comparison of these findings in future years may prove interesting.

Notable finds were:- Live *Dentimargo cairoma* under a rock at Kaingaroa; a large pure white, live *Buccinulum pertinax* at Taupeka Point; live *Cominella n. redalei* cast ashore in a very fresh wash-up at Owenga along with live *Calliostoma waikanae*, *Xymene ambiguus*, *Dosinia maoriana*.

The weather had been very inclement prior to our departure delaying this by one day. The following day we ventured out for the low tide in the morning but were confined to our accommodation in Waitangi for the remainder of the day by storm force winds and rain. For the rest of the week the wind kept changing mainly north and south-east creating large seas along the Hanson Bay/Owenga coastline, finally culminating in the exciting washup we came upon at the south end of Hanson Bay on our last day.

Details of the localities visited during the week and the conditions were as follows: (wind conditions care of a fellow plane passenger): *Saturday 8 March*: Arrive on Island: PM. walk north along Waitangi beach. Wind NE. *Sunday 9 March*: AM low tide collect at Waitangi south of wharf. Wind very strong NE. Low tide 0.0 m. *Monday 10 March*: Owenga low tide collect south of wharf plus beach collect below paua factory (midtide). Wind SW/SE/S. Big NE swell. Low tide 0.0 m. *Tuesday 11 March*: Taupeka Point beach and low tide collect end of Wharekauri Bay. Wind light SW. Low tide 0.0 m. *Wednesday 12 March*: Matarakau Point beach collect at mid tide. Kaingaroa low tide collect western side of Point. Wind strong SE. Big SW swell. Low tide 0.0 m. *Thursday 13 March*: Port Hutt low tide collect. Wind strong E. Low tide 0.0 m. *Friday 14 March*: Owenga beach collect at low tide from Te One stream to Gillespie Creek. Wind SW. Low tide 0.1 m. *Saturday 15 March*: Okawa Pt low tide collect. Wind NW. Low tide 0.3 m. *Sunday 16 March*: AM Waitangi Beach; PM Owenga beach collect at low tide from Te One stream to Gillespie Creek. Wind NW. Low tide 0.4 m. *Monday 17 March*: Return.

Waitangi Beach (Petre Bay) - This is an excellent long beach for finding shells washed up in good condition. Good specimens of *Modiolus granosa* and *Cookia sulcata* frequently wash in still containing the animal, also *Modiolus aereolatus*, *Barnea similis*, *Modiolarca impacta*, *Cabestana spengleri* and *Haliotis virginea*. The area around the bridge is usually best. One nice *Cabestana* I found washed in damaged was about 130 mm so they obviously grow large here. *Cookia sulcata*, *Cominella maculosa* and *Haliotis iris* are common below low tide in front of the hotel. Broad banded *Buccinulum lineum* nestled in sand ledges were not uncommon in 1994. However, flooding of the nearby stream can discolour the water and turn it cloudy.

Waitangi rocks south of wharf - This area is accessible from mid to low tide. Here a small rock platform backs onto steep cliffs exposing a number of rock pools. Look for *Cantharidus opalus canoni* on the weed near the reef edge along with small red starfish. There is good shell sand in patches among the rocks and nice *Cellana strigilis* on the mid tide rocks.

Owenga low tide south of wharf - A new collecting area for me. We walked from the wharf south but access is better beside the nearby bridge further south as the first bluff would be difficult to get around above the low tide. In front of the stream mouth is a sandy area containing some weed. Some small shells were found on the weed and under the few rocks present. Many *Buccinulum lineum* (narrow lined) were half buried in the sand although most were pitted or discoloured from the stream effluent. From the creek south there are a number of small bays and large reef areas. The bottom is mainly sandy. Small *Buccinulum vittatum* were common under stones and the beaches above high tide level contained quite a lot of wash up material. Large numbers of empty craypots are found in and about Owenga. A couple of *Astraea heliotropium* and some nice pink coral were obtained from inside them.

Owenga below paua factory - This is a small area of sand at the beginning of the gravely shelly beaches that run from here to the sand at the south end of Hanson Bay. It was notable because the best washed up *Haliotis virginea morioria* occurred here in good condition day after day along with number of smaller shells - possibly dumpings from the factory?

Owenga from Te One stream to Gillespie Creek - Te One stream is where the road from Waitangi passes over a bridge after joining the coast before Owenga. From here to Gillespie Creek at the south end of Hanson bay is particularly fruitful for shell washups. The sea was too rough and the washups too diverting to attempt any low tide collecting while we were here. In 1994 the best washups were in front of the Te One stream mouth. This time it was around the corner close to Gillespie Creek.

We had a quick look at the Te One Stream mouth on the Monday following our low tide collect further south and had been disappointed to see few washups of shells, no sponge containing *Chlamys* as in 1994 and the few shells round the stream mouth were discoloured from the stream sediment. Usually this is a good washup area for large *Gari convexus* and *G. stangeri*, *Cominella n. iredalei*, *Lepsithais launosus* and *Austrofusus*. It is also worth moving the gravel on the low tide line for *Micrelenchus caelatus morioria* and *Monodilepas skinneri*. On Friday when we returned there were more shells with the best being around the corner nearer Gillespie Creek. The best finds were two *Cominella n. iredalei* with the animals still very much alive which had been washed into low tide pools.

Pat and I returned on our last afternoon and this time by the Gillespie Creek mouth there was a marvellous wash-up. For one hour it was solid collecting, bent over with a stick moving the shells from side to side to see what was revealed. There was one area filled with large numbers of heavy sea squirts and another area a few metres wide containing a solid wash-up of shells. Sponge containing fresh and live *Chlamys zelandiae* were common. None of this had been present a few days earlier. Imbedded amongst the sea squirt material was *Modiolarca impacta* and *Maoricolpus roseus*. Further along in the washup many shells had been cast ashore still containing the animal. These included *Cominella n. iredalei*, *Tanea zelandica*, both species of *Gari*, *Calliostoma waikanae* (3), *Xymene ambiguus*, *Barbatia*, *Tucetona*, *Modiolus*, *Dosinia maoriana* (1), *Oxyperas elongata* (1) and *Pododesmus zelandicus* (1).

Taupeka Point - A good area for beach collecting in 1994 and again in 1997. The Point is littered with shells. However, it is stony and shells do get a little worn. This time there were far more *Haliotis virginea morioria* washed up in good condition. Shells worth looking for are *Calliostoma granti*, *Lepsithais lacunosus* and very large *Buccinulum vittatum*. Both in 1994 and this time a large double *Chlamys gemmulata* and some virtually whole *Alcithoe wilsonae* were found.

Taupeka low tide collect south end of Wharekauri Bay - I was particularly interested in trying to find the large *Buccinulum vittatum* live. *B. vittatum* was certainly present under rocks. The large ones, however, must be further out. Living on the underside of rocks was *Tugali suteri*, small *Trochus viridus*, *Emarginula striata*, *Sigapatella novaezelandiae* and *Cardita aoteana*.

Further out live on the weed were *Cantharidus opalus cannoni*. The best find was a *Buccinulum pertinax* on a rock in about 6 inches of water at low tide. It was pure white and smooth, not the knobbed (*marwicki*) form that were found elsewhere on the Island.

Matarakau Point [not shown map; the major point between Kaingaroa and Taupeka Point] - This year we only covered the western side of the Point and at mid tide. The area is good for large *Gadinalea nivea*, *Xymene traversi* and good shell sand; notably coloured pink with many *Radiacmea conspicua*.

Port Hutt low tide collect - A good area for broadbanded *Buccinulum vittatum* under rocks also *B. lineum*, many having an attractive orange/ brownish colouring. This was the first location I had seen the endemic *Margarella fulminata* live. Unlike its mainland New Zealand relatives *M. turneri* which lives under stones and *M. rosea* from inside kelp holdfasts, *M. fulminata* was grazing in good numbers on fine, stunted brown weed at low tide. *Cellana strigilis* is common on the mid tide rocks. Pat found a piece of *Calliostoma selectum* on the beach. John Marston's Comment to the 1994 checklist indicates it is commonly trawled off the northern coast.

Kaingaroa Beach - Mainly notable for good shellsand, particularly *Thoristella chathamensis*. The wharf in the main bay is worth looking between the wharf slats where we found a few small *Calliostoma granti* and a *Buccinulum pertinax* of the (*marwicki*) form all still containing the operculum and animal remains.

Kaingaroa low tide collect western side of Point at end of the road - There are lots of low rocks at the end of the beach. Wading below low tide we were surrounded by kelp fronds and standing on paua. A few *Cantharidus opalus cannoni* clung to the weed. The weed base contained many small shells similar to Taupeka Point. Here *Rissoina chathamensis* and *Herpetopoma bella* were common along with some live *Xymene traversi*. Amongst these under one rock. I noticed something bright yellow of small size. It appeared to be a yellow *Marginella* with red markings on the lip. I was sure it would be something special. Later it was revealed to be *Dentimargo cairoma*, the bright yellow animal making the transparent shell appear yellow. Worn ones were also in the shell sand from Okawa Point but this was the first live recording. When first picked up the animal waved numerous yellow tentacles out through the opening. A very fresh hermit crab inhabited *Thoristella chathamensis* was found on the underside of a *Haliotis australis* but no live ones - they must live deeper.

Okawa Point beach - It's really four wheel drive country to get out here. You also need to get the key from the station to open the gate. The alternative, a walk from the gate, would take about two hours. The Point takes a further forty minutes (depending on shell stops) to walk round it, although because it is so low lying you can cut across it. We took our car through the gate about as far as we could go and opted for the one hour walk. Not as much washed up as in 1994 and this time being there at the low tide revealed a reef that went a long way out. Shells therefore had a long way to travel before washing up. In 1994 we found a superb area of shellsand at the junction of the bay to the west of the Point. This year the best shellsand was on the Hanson Bay side. The most bits of *Calliostoma tigris* we had seen were here and I remember in 1994 picking up many bits of sponge containing *Chlamys*. This time the only items worth picking up were some shell sand and quality, shiny yellow *Pseudarcopagia disculus*.

Okawa Point low tide collect - We decided to concentrate on the west side of the Point for a low tide collect. *Buccinulum vittatum* was everywhere. Every low tide rock revealed a cluster of the wide striped black/white or all white varieties. Most were small, although in nice, clean condition. *Haliotis iris* was abundant. I searched in vain for live *Thoristella chathamensis*, although the shell sand contained many. The shell life didn't change much as the reef went out at basically at the same depth all the way till it started to get rough. A fishing line thrown in had a cod on it when pulled up at the time to leave.

Comparing our findings with comment by John Marston appended to the 1994 check list the following can be noted:- pp 43/44 (6) *Xymene ambiguus* was washed in live and *Ruditapes largillierti* valves found in fresh condition. This would support their living (not fossil only), presence on the Island; p. 45 (4) *Calliostoma waikanae* was washed in live at Owenga. This supports Powell's observation/holotype finding; p. 42 (7) *Buccinulum vittatum* was very commonly living under stones on all coastlines. *Buccinulum lineum* is also not uncommon.

I would also proffer the following observations:- The broadlined (*waitangiensis*) form of *Buccinulum lineum* appears to be a variation particular to Petre Bay (Waitangi and Port Hutt) whereas the usual narrowlined form was found elsewhere on the Island. All *Buccinulum vittatum* seen were either the broad lined (*bicinctum*) or white (albino) forms in most cases cohabiting under the same rocks. The Chathams Islands specimens grow to a very large size but otherwise appear identical to mainland New Zealand *B. vittatum*. Many species that one might expect to be present are probably not because of the lack of a quiet harbour or sheltered areas on the Island. The coastline is very open and rough. Several species that occur in the intertidal zone on the mainland appear to live at deeper depths on the Chathams i.e. *Thoristella chathamensis*, *Lepsithais lacunosus*, *Cominella nassoides*. The Chatham Islands form of *Catharidus opalus* grows slightly larger and squatter (form *cannoni*) than mainland New Zealand but in all other respects appears identical and was living on the same weed as is seen on around Cook Strait.

Lastly, there were a number of interesting creatures seen in addition to the molluscs described. They included:-

- * numerous "sea centipedes" (polychaetes) - some very long and included a bright green creature swimming rapidly in the sea at Owenga that perhaps was a "centipede" but from my recollection of a fossil trilobite looked exactly like one in shape. It had a segmented body about an inch across, a wider arrow shaped head and rear segment. One minute it was dumped by the tide in a pool and with the next wave was gone;
- * many brittle stars that I had not seen on the mainland, some striped red and red/brown;
- * also the attractive little red starfish amongst the weed at Waitangi;
- * crabs I had not seen before again red and red/brown.

In addition to *Archidoris wellingtonensis*, at least three other species of nudibranchs were seen in low tide pools. As I am unfamiliar with their identification I will record them as follows:- cream colour with a yellow ring around the periphery (Kaingaroa) *Glossidoris aureomarginata*? cream/ grey colour with brown blotches (Taupeka) small, all yellow (Owenga).

[Note re. the following tables: - the "W1" etc. for collecting sites is as used in the 1994 checklist (*Cookia*, vol. 7, no. 3), and D = dead; L= live.]

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CHATHAM ISLAND
SHELL LIFE

	Waitangi beach	Waitangi low tide south of wharf	Owenga low tide south of wharf	Owenga below paua factory	Owenga beach north of Te One	Taupeka beach	Taupeka low tide rocks	Matarakau beach	Port Hutt low tide	Kaingaroa beach	Kaingaroa low tide	Okawa Pt beach	Okawa Pt low tide	Comment
GASTROPODA														
<i>Cellana strigilis chathamensis</i>		L	L				L		L		L		L	Common on mid to low tide rocks
<i>Radiacmea inconspicua</i>		D		D	D	D		D		D	L			Clean specimens with pink interiors
<i>Haliotis iris</i>		L	L			L	L				L		L	Very common "back to back"
<i>Haliotis australis</i>	D	L	L				L				L		L	
<i>Haliotis virginea morioria</i>	D		D			D		D					D	Not uncommon washed ashore most locations. Best at Taupeka Pt and Owenga below paua factory
<i>Emarginula striatula</i>		D				D	L	D			L	D		Very clean specimens on underside of rocks at low tide
<i>Montfortula rugosa</i>				D			L	D				D		Underside of rock ledges at low tide. At Taupeka under large rocks between mussels.
<i>Tugali suteri</i>		D		D			L			D			L	Under low tide rocks on sandy bottom
<i>Cantharidus opalus cannoni</i>	D	L	D			D	L	D		D	L			Grazing on brown seaweed at/ below low tide; same weed as Wellington
<i>Melagraphia aethiops</i>		L			D	D					L			Large at Owenga; on mid tide rocks
<i>Diloma nigerrima</i>										D				
<i>Margarella fulminata</i>		D	D	D	D	D	D	D	L	D		D		Grazing on stunted red/ brown weed
<i>Microelenchus caelatus morioria</i>					D	D								Not uncommon in shell gravel at low tide drift line
<i>Microelenchus dilatatus</i>			D	D		D				D		D		Not uncommon in shellsand
<i>Trochus viridis</i>	D	D			D	D	L	D	L	D	L			Specimens seen were small in comparison with mainland
<i>Thoristella chathamensis</i>										D	D	D		Not uncommon in shellsand and freshly dead in rock pools
<i>Calliostoma granti</i>	D				D	D				D				Common and large washed up at Taupeka
<i>Calliostoma waikanae</i>					L									Two washed up live
<i>Calliostoma selectum</i>									D					Piece only
<i>Calliostoma tigris</i>	D					D		D				D		No whole specimens
<i>Herpetopoma bella</i>		D	L	D	D	D				D	L	D	L	Under stones at low tide
<i>Antisolarium egeum</i>				D	D	D						D		Not uncommon in shellsand
<i>Modelia granosa</i>	D				D	D								Commonly washed ashore. Best from Waitangi beach, some still with animal
<i>Astraea heliotropium</i>			D			D								Often in craypots
<i>Cookia sulcata</i>	L	L									L			Very common just below low tide and on Waitangi beach

L= Live D= Dead

CHATHAM ISLAND
SHELL LIFE

	Waitangi beach	Waitangi low tide south of wharf	Owenga low tide south of wharf	Owenga below paua factory	Owenga beach north of Te One	Taupeka beach	Taupeka low tide rocks	Matarakau beach	Port Hutt low tide	Kaingaroa beach	Kaingaroa low tide	Okawa Pt beach	Okawa Pt low tide	Comment
<i>Crosseola vesca</i>										D	D	D		In shellsand
<i>Zeacumantus subcarinatus</i>		D			D	D			L			D		Fine clean condition under stones at mid tide
<i>Maoricolpus roseus</i>	D				L									Washed in live imbedded with sea squirts
<i>Nodilittorina cincta</i>		L										D		Small; on high tide rocks
<i>Risellopsis varia</i>		D			D	D				D		D		Larger than on mainland, common in shellsand
<i>Rissoina chathamensis.</i>		D			D				L		L	D		On the underside of rocks with weed. Common in shellsand
<i>Sigapatella novaezelandiae</i>	D	D			D	D	L		L					On the underside of large rocks at low tide
<i>Trichosirius inornatus</i>		D						D		D				In shell sand; of large size
<i>Tanea zelandica</i>					L	D				D	D			Very large, washed ashore some still with animal/ operc
<i>Uberella vitrea</i>				D										Shellsand
<i>Semicassis pyrum</i>					D	D								Washed in with animal and operc at Owenga
<i>Cabestana spengleri</i>	D				D	D								Commonly washed ashore. Best specimens from Waitangi beach
<i>Argobuccinum tumidum</i>	D				D	D								Commonly washed ashore
<i>Seila cincta</i>					D	D				D		D		Not uncommon in shellsand
<i>Janthina exigua</i>								D						
<i>Poirieria zelandica</i>						D				D				Several obtained from fisherman at Kaingaroa; short, stunted spines
<i>Terefundus crassiliratus</i>												D		Shellsand
<i>Xymene ambiguus</i>	D				L									Washed in containing live animal at Owenga
<i>Xymene plebeius</i>					D									
<i>Xymene traversi</i>		L		D		D		D	L	D	L	D		Under rock ledges at low tide. Common and large at Matarakau
<i>Lepsiella scobina</i>											L		L	Not common on midtide rocks
<i>Haustrum haustorium</i>		L	L				L		L		L			Common at Waitangi; midtide rocks
<i>Lepsithais lacunosus</i>	D				D	D		D						Common washed ashore, large, not seen live at low tide
<i>Cominella adspersa</i>	D				D									
<i>Cominella maculosa</i>	D	L	L		D	D	L		L		L			Common out crawling at low tide; clean specimens some part orange
<i>Cominella glandiformis</i>					D									Not common
<i>Cominella nassoides iredalei</i>	D				L	D								Eight specimens washed in live at Owenga

L= Live D= Dead

CHATHAM ISLAND SHELL LIFE

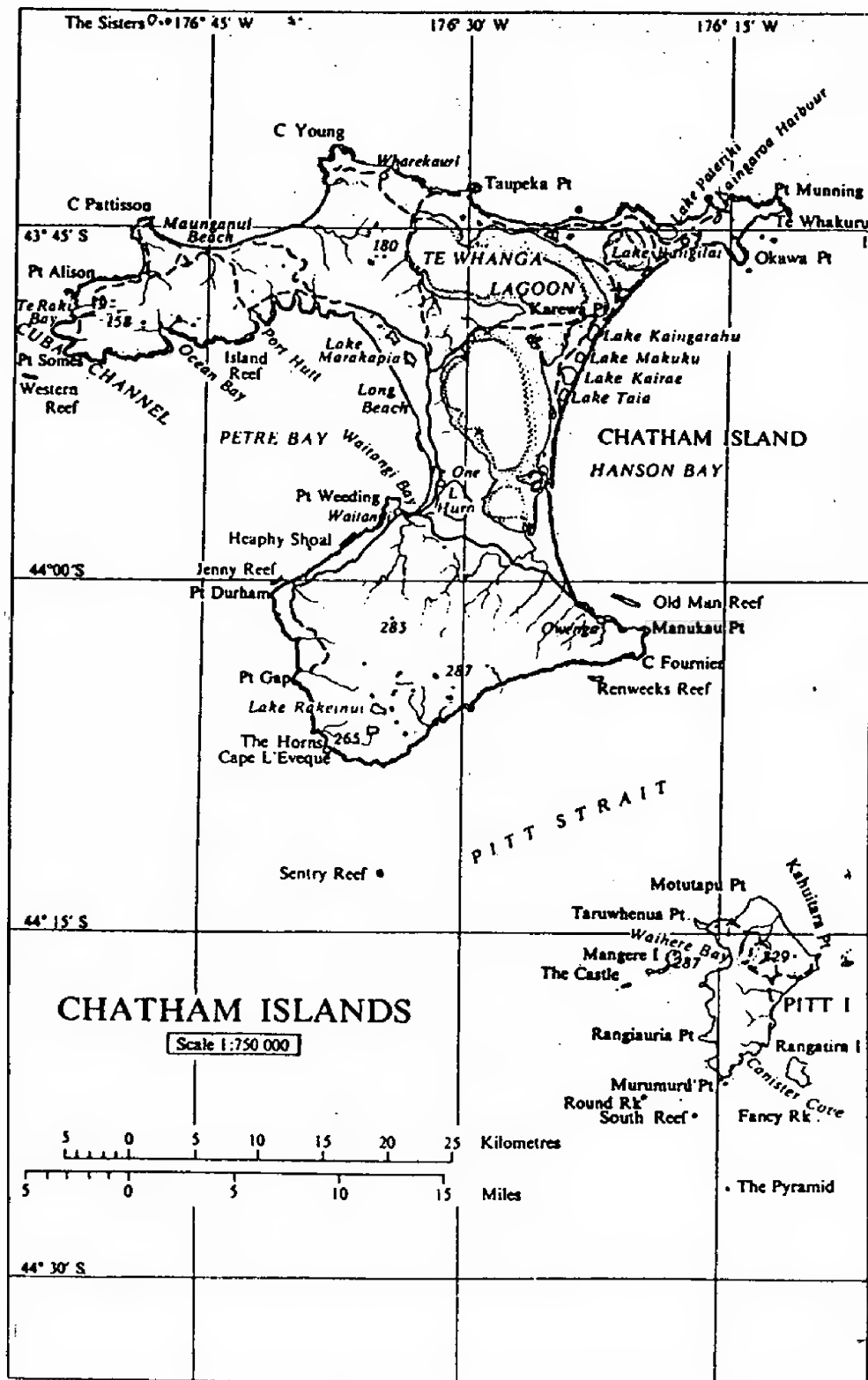
	Waitangi beach	Waitangi low tide south of wharf	Owenga low tide south of wharf	Owenga below paua factory	Owenga beach north of Te One	Taupeka beach	Taupeka low tide rocks	Matarakau beach	Port Hutt low tide	Kaingaroa beach	Kaingaroa low tide	Okawa Pt beach	Okawa Pt low tide	Comment
<i>Austrofusus glans</i>					D	D								
<i>Austrofusus glans chathamensis</i>					D	D								Commonly washed ashore. Generally worn appearance
<i>Buccinulum linea</i>	D		L		D	D		D	L					West coast specimens are wide lined (<i>waitaniensis</i> variety) also part orange at Port Hutt. Part buried on sandy bottom or ledges
<i>Buccinulum pertinax</i>	D				D	D	L				L			Uncommon intertidally. All pinkish, juvenile, knobbed (<i>marwicki</i> form) other than one smooth, all white, alive in 12 cm. water at Taupeka
<i>Buccinulum vittatum bicinctum</i>			L				L		L		L		L	Very common; largest at Taupeka. Most are wide lined black/white and co-existing with all white ones. Orange/brown colour at Port Hutt.
<i>Paxula allani</i>			D									D		Not uncommon in shellsand
<i>Paxula subantarctica</i>				D		D					D	D		Shellsand. Freshly dead at Kaingaroa
<i>Alcithoe wilsonae</i>					D	D								None whole
<i>Dentimargo cairoma</i>											L	D		One live under low tide rock in about 10cm of water. Animal bright yellow; shell transparent; central stripe and red markings on lip.
<i>Austromitra rubiginosa</i>					D	D				D		D		Common in shellsand large, pinkish
<i>Neoguraleus lyallensis</i>				D							L	D	D	Common in shellsand. On underside of low tide rocks
<i>Neoguraleus murdochi</i>		D									L			Shellsand
<i>Turbonilla moorei</i>				D								D		Shellsand
<i>Archidoris wellingtonensis</i>		L	L											In low tide pools
<i>Gadinia conica</i>		D		D				D		D				Common in shell sand at Matarakau
<i>Siphonaria australis</i>		L					L							On mid to low tide rocks
<i>Marinula filholi</i>		D			D							D		Shellsand
BIVALVIA														
<i>Barbatia novaezealandiae</i>	D				L	D								Washed in live at Owenga
<i>Tucetona laticostata</i>					L	D								Washed in live at Owenga
<i>Aulacomya ater maoriana</i>	D				D	D								Commonly washed ashore
<i>Modiolarca impacta</i>	D				L	D								Imbedded with sea squirts washed ashore at Owenga
<i>Trichomusculus barbata</i>											L			On the underside of low tide rock

L= Live D= Dead

CHATHAM ISLAND
SHELL LIFE

	Waitangi beach	Waitangi low tide south of wharf	Owenga low tide south of wharf	Owenga below pāua factory	Owenga beach north of Te One	Taupeka beach	Taupeka low tide rocks	Matarakau beach	Port Hutt low tide	Kaingaaroa beach	Kaingaaroa low tide	Okawa Pt beach	Okawa Pt low tide	Comment
<i>Modiolus areolatus</i>	D				L	D								Small size. Washed ashore live at Owenga
<i>Tiostrea chilensis lutaria</i>	D													
<i>Pecten novaezelandiae</i>					D									Dredged single valves common
<i>Chlamys zelandiae</i>	D				L	D								Lots cast ashore in sponge at Owenga; all colours some live
<i>Chlamys gemmulata</i>					D	D								Some doubles cast ashore at Taupeka; large size
<i>Pododesmus zelandicus</i>					L									In Owenga washup
<i>Divaricella huttoniana</i>						D								Single valve only
<i>Diplodonta globus</i>						D								
<i>Lasaea hinemoa</i>												D		Shellsand
<i>Borneola reniformis</i>		D								D				Shellsand
<i>Mytilus vivens pinguis</i>												D		Shellsand
<i>Cardita aoteana</i>					D		L	D			L			Small on the underside of rocks at low tide
<i>Purpurocardia purpurata</i>					D									Single valve in fresh condition
<i>Oxyperas elongata</i>					L									Washed ashore live 92mm x60mm
<i>Scalpomactra scapellum</i>								D						
<i>Paphies subtriangulata</i>	D													
<i>Pseudarcopagia disculus</i>	D				D	D	L					D		Buried in sand under low tide rocks nice shiny yellow at Okawa
<i>Gari convexa</i>	D				L									Large red coloured specimens. Some washed in live at Owenga
<i>Gari stangeri</i>					L									Large (some live), at Owenga
<i>Soletellina nitida</i>	D													
<i>Dosinia maoriana</i>					L									Large size 40x40mm washed in
<i>Irus reflexus</i>		D				D								
<i>Ruditapes largillierti</i>					D				D					Two single valves found; one in fresh condition
<i>Barnea similis</i>	D													Doubles commonly washed ashore

L= Live D= Dead



THE MOLLUSCS OF THE CHATHAM ISLANDS - PART TWO

By John Marston

Volume 7 No. 3 of *Cookia*, which appeared in January 1996 was devoted entirely to the Chatham Islands and included memories by Dr R.K. Dell and Elliot Dawson of their experiences on the 1954 Chatham Islands Expedition; the remaining articles were about our visit exactly 40 years later.

The present issues now refers to two more visits by several Club members to the Chathams in 1996 and early 1997, thus showing our continued interest in that fascinating region. In the 1996 *Cookia* I gave an updating of Dell's 1960 Checklist of the Chatham Islands mollusca, as much research since then had necessitated name changes. That Checklist is now also outmoded with the advent of Spencer and Willan's N.Z. Checklist, so I have prepared a new version of my list in which about one quarter of the names have been changed, the sequence of families also changed, and new discoveries added. Although the Spencer and Willan sequence is followed, Powell page references are still given to help follow the name changes.

In summary, the following species did not appear in Dell's 1960 or our 1996 Checklists so will be in my new Checklist, currently being compiled for publication in a forthcoming *Cookia*, which will include our new records, many of which are being sorted out gradually. Thanks are due to Mr Bruce A. Marshall, Te Papa Museum of New Zealand, for his accurate determinations of the very difficult micro molluscs, many belonging to families which he is revising as time permits.

ADDITIONS TO CHATHAMS MOLLUSCA IN LESS THAN 100 FATHOMS

[i.e. less than 182 metres]

S & W page

- | | |
|----|--|
| 16 | <i>Cirsonella</i> n. sp. - W39 |
| 16 | <i>Zalipais benthicola</i> Powell, 1927 - W12 |
| 23 | <i>Mendax trizonalis odhneri</i> (Powell, 1927) - W39 |
| 23 | <i>Ranella olearium</i> (Linnaeus, 1758) - shelf edge off Kaingaroa |
| 25 | <i>Scalaronoba</i> cf. <i>costata</i> Powell, 1927 - W-12 |
| 25 | <i>Fusceulima murdochi</i> (Hedley, 1904) - W15 |
| 27 | <i>Buccinulum finlayi</i> Powell, 1929 - W31, W33 |
| 28 | <i>Provocator mirabilis</i> (Finlay, 1926) (beach specimen) - W16 |
| 30 | <i>Nepotilla</i> cf. <i>powelli</i> Dell, 1956 (only from 30-35 fm) - W12 |
| 30 | <i>Liracraea epentroma</i> cf. <i>whangaroaensis</i> (Murdoch, 1905) - W12 |
| 31 | <i>Brookesena neozelanica</i> (Suter, 1908) - W39 |
| 44 | <i>Philobrya pictada</i> (Finlay, 1930) - W12 |

Key, as in *Cookia* 1996 : W10, Port Hutt, low tide rock pools; W12, Port Hutt, on bryozoans from 30-35 fm (55-64 m); W15, Cape Pattison, tide drift line; W16, Taupeka Point, storm level; W31, Kaingaroa, blue cod stomachs, cage set at 30 fm (55 m); W33, Kaingaroa, craypot, 35 fm (64 m); W39, The Fortyfours, craypots, 30-35 fm (55-64 m).

Nepotilla cf. *powelli* Dell, 1956 has been added to this Checklist of "less-than-100 fathoms" Chathams shells, as my specimen came from bryozoans on an old craypot at 30 to 35 fathoms outside Port Hutt. The type locality for *N. powelli* is east of the Fortyfours in 130 fathoms so outside the scope of Dell's 1960 list.

Buccinulum finlayi was one of our 1994 shells from the blue cod stomachs taken by Mrs Thelma Henderson from the cod cages at 30 to 35 fathoms, and since determined by Dr Alan Beu. We have now got two more specimens from the same area off Kaingaroa, from craypots in the same depth.

For family reasons there was no "Christmas holidays" for either Don Watson or me in December 1995, but by March 1997 the need for a break was obvious, so Don suggested that we pop across in the only possible break available. We could fit in no more than 8 days there plus two travelling days, and, unfortunately, they clashed with the aeroplane licensing withdrawal problems, but it was then or never. Once there we found we might be forced to return three days earlier still.

Our plane swooped in over Waitangi first, and between the clouds we were dismayed to see Petre Bay was chocolate brown, which turned out to be mud and not the usual peat stain. There had been torrential rain in the southern hills, and even when we left the Nairn River was still discharging mud, so with zero visibility we couldn't snorkel at all around Waitangi. We soon discovered that our favourite beaches had been adversely affected too. Napper Point was down to bedrocks, and Whangamoe Inlet was totally devoid of shells this time.

OWENGA SHELLY SANDS

Although we made at least four visits the results were depressing compared with the happy occasions when the five of us were there in January 1994, and when we had assumed Owenga was like that on every day. Paired *Gari convexa* [ex *G. hodgei* ex *G. lineolata*] were scarce, but *Gari stangeri* was even scarcer. Large single valves of *Dosinia maoriana* were reasonably plentiful, but unlike 1994, there were no *Dosinia zelandica* valves, *Atrina pectinata zelandica*, *Cyclomactra ovata*, *Panopea smithae*, or fragile rock boring pholads. Fresh *Cominella nassoides iredalei* were scarce, and no *Cabestana exarata* [ex *C. waterhousei*] or *Charonia rubicunda* at all, so we were lucky to discover so many new records in 1994.

Although some Nukumaruan fossil *Xymene mutabilis* (Marwick, 1928) were still washing out as in 1994, there were no further specimens of fossil *Alcithoe wilsonae* there.

This time I checked up Te One Stream above the bridge, but the rocks were volcanic with no noticeable seam of fossils. The stratum of solid shells is roughly no higher than the concrete abutments of the present bridge, with an overlay of consolidated quartz sand running in a northerly and easterly direction, presumably masking a Nukumaruan seam from which the *Xymene mutabilis*, fossil *X. ambiguus*, fossil *Alcithoe wilsonae*, and the fossil *Cominella nassoides ellisoni* (= *C. n. consobrina* Powell) wash out and are then returned onto the beach with both fresh Recent plus peat-stained and worn Recent specimens.

Our second visit to Owenga was a surprise as the sea was calm, for the first occasion ever, so we donned our wetsuits and swam in the peat-stained waters. Don went as far out as the reef which fringes the lagoon and then drops away very sharply, but there were very few live shells compared with what we find on the beach itself, so most must come from the deep beyond the reef. In our area the seafloor is solid, without loose rocks under which animals can shelter, as normally the wave action is violent there.

MOUTAPU POINT

A loader scrapes up the lovely Nukumaruan fossiliferous sands for crushing as agricultural lime, so we rescued everything we could, even barnacles.

Of greatest interest were the *Cyclomactra ovata*, to compare their shells with the huge ones from two miles north of Owenga Shelly Sands, and also the *Cominella nassoides ellisoni*.

Cominella nassoides ellisoni -

When a reasonably large collection of shells has been made, a wide range of shells characteristics is revealed, which is why Powell could select the tall, narrow form and name it *C. n. consobrinus*. The Moutapu fossil range is -

(1) squat shells, virtually devoid of ribs and spiral cords, giving an overall smooth exterior. In *Cookia* 1996: 48-49 I referred to a live-taken specimen matching this, taken from a craypot at 15 fathoms off Cape Young, so this squat form is still alive to-day. In 1996 I noted it as being 46 x 26 mm, and having 12 ribs, as I was showing a rib count, but in actual fact they were merely 12 nodules representing incipient rib places;

(2) tall narrow shells, with many strong ribs and strong spiral cords, giving a totally different appearance;

(3) there is then a gradual range between these two extremes so that they merge from one to the other, just as the living *C. n. iredalei* range from one extreme to the other.

The squat smooth form is *Cominella nassoides ellisoni* Marwick, 1928, and is illustrated in Fleming's *Marwick's Illustrations of New Zealand Shells*, Plate 108, figure 1318.

The tall narrow solid shells are Powell's *C. n. consobrina* illustrated by Gibbs & Scott (1989) in *Poirieiria* 15 (6): 1-4. *C. n. consobrina* is based on three specimens which he collected at Owenga Shelly Sands in 1933 plus one which Fleming found with Powell at the Titirangi fossil beds. Since bulldozers had not reached New Zealand by 1933, probably the Moutapu fossil beds were little known, and transport on the Chathams would have been difficult then.

We stopped fossil collecting as it was too dark to see by 4 p.m. Then we were entertained for one hour by the most violent forked lightning display that Don and I had ever seen. We sheltered in the landrover as the only other piece of cover was a single tree.

A new area for us was Okahu Point, between Wharekauri (where Powell collected) and Taupeka. Don's greatest excitement there was finding an *Alcithoe wilsonae*. For me the main interest was locating *Onchidella* in shady crevices, as we found none in 1994, and magnificent *Lepsiella scobina scobina* up to 34 mm even with the spire eroded. The surf crashed very violently onto that northern coast.

Also new to us were rocky areas east of Kaingaroa, from Point Munning to Te Whakaruru. The area is so desolate now but was once intensely settled, with only the remains of a shore whaling station. The first Moravian mission was there, before the three-storeyed building which we visited at Maunganui in 1994.

Of the buccinulids the only plentiful intertidal species is *Buccinulum vittatum bicinctum*, and they were living in channels somewhat protected by fringing reefs. The colour range was surprising: pure white all over - white with dotted lines - white with two blue bands - white with two brown bands - blue all over - blue with fine blue lines - orange with two brown bands (rare, except at Port Hutt). Considering that "bicinctum" means "two girdles or bands", the name is not always appropriate. The shells that are blue with fine blue lines look like our *B. vittatum littorinoides* from Porirua Harbour.

Taupeka Point was as interesting as usual, although no further beach specimens of *Atrina* or *Charonia* as in 1994. As a new record for that beach, Don found a keyhole limpet, *Monodilepas skinneri*, the first we'd seen other than at Owenga. I found a *Fusitriton magellanicus laudandum* there, a new record for Taupeka. In 1994 Don found a perfect specimen in the cove by Owenga wharf. Close to the *Fusitriton* was another new beach record, *Mayena australasia* (the *blacki* form), although we had got specimens live-trawled. Most surprising of all on the beach was a *Provocator* [formerly *Iredalina*] *mirabilis*. Normally one would expect to find that only at 200 fathoms or so, hence most unlikely to be washed ashore. Taupeka Point is not close to a trawling area and well away from a port. Dr Alan Beu considers *Fusitriton*, from known records, to be colonising shallower waters, so perhaps several genera are now moving closer inshore.

At Kaingaroa we spent a day cleaning a net long lost at sea. We removed many *Chlamys gemmulata*, *C. zelandiae* forma *dieffenbachii* (with colours ranging from lavender to lavender with yellow stripes), and a few *Zygochlamys dichroa*. An amused youth volunteered that his sister had planned "to take big curly shells out to New Zealand to sell as lamps." However, the problem was: they couldn't remove the smell. So he dumped them all at the tip. We located sundry *Charonia*, and *Ranella olearium* which was not on the 1960 nor 1996 Checklists. The youth said that they were trawled on the edge of the shelf off the Chatham. There were more bivalves there too.

A puncture 35 miles from base cost us most of one of our precious 8 days as we had to change the tyre and then get urgent repairs.

Okawa Point was not as productive as usual, except for our favourite *Lepsithais lacunosus* which, at that place, are quite exceptional in size and sculpture, so it's no wonder that Finlay named them as a separate species. As it was calm we donned wetsuits and really concentrated on searching for living *Thoristella chathamensis* for Bruce Marshall. From 1937 onwards (but not 1979) Powell's books assured us that they were "not uncommon under stones at low tide," but we could never locate any. Dell's records ranged from 4 to 38 fathoms [7-69 metres], apart from beach specimens, so Powell in 1933 appears to have been the only one to collect *Thoristella* alive at low tide. Because they are endemic to the Chathams, we'd always especially watched for them.

We were lucky in not being forced to fly out three days early. Although not a "fun time" as when we had Doreen, Jenny, and Donald junior with us in January 1994, nevertheless a trip to the Chathams is always a truly wonderful experience.

STEWART ISLAND
SHELL LIFE AROUND OBAN

NAME	Deep Bay Paterson Inlet	Vaila Voe Paterson Inlet	Lonnekers Halfmoon Bay	Horseshoe Bay beach	Horseshoe Bay low tide	Ringaringa low tide	Sandhill Bay Native Island	Ackers Point	Cow Island shell sand	Cow Island coast low tide	Comment
GASTROPODA											
<i>Cellana radians</i>						L					<i>Perana</i> form not uncommon
<i>Cellana ornata</i>						L					Clean specimens
<i>Cellana strigilis redimiculum</i>					L			L		L	Common limpet on open coast Under smooth stones with <i>Atalacmea fragilis</i>
<i>Notoacmea elongata</i>					L						
<i>Notoamea pileopsis sturnus</i>							L			L	On shaded parts of large rocks
<i>Notoacmea parviconoidea</i>						L					On backs of blue mussels
<i>Atalacmea fragilis</i>		L			L						Not uncommon under smooth rocks with <i>Diloma bicanaliculata lenior</i>
<i>Tugali suteri</i>									D		
<i>Haliotis iris</i>										L	Common in low tide isolated areas
<i>Haliotis virginea</i>				D							
<i>Cantharidus opalus</i>				D							
<i>Diloma arida</i>								L			On midtide rocks on open coast
<i>Diloma bicanaliculata lenior</i>		L			L						Same locality as <i>Atalacmea fragilis</i>
<i>Diloma subrostrata</i>	L										On midtide rocks nice yellow/ black colouring
<i>Micrelenchus dilatatus</i>									D		Shellsand
<i>Micrelenchus parcipictus</i>		L	L								Under stones on gravel bottom
<i>Thoristella chathamensis</i>					L					L	Under stones at low tide sheltered coastal areas
<i>Margarella turneri</i>					L				D		Under stones on sandy bottom with light weed
<i>Margarella antipoda rosea</i>								L	D	L	Inside kelp holdfasts
<i>Calliostoma punctulatum</i>				D		L					Sandy locations on low tide rocks
<i>Calliostoma granti</i>				D							White; washed up
<i>Zethalia zelandica</i>									D		Shellsand
<i>Modelia granosa</i>				D							Large clean condition some still with animal /operc
<i>Turbo smaragdus</i>					L					L	Not common, large on sheltered low tide rocks
<i>Astraea heliotropium</i>				D							In craypots or washed ashore
<i>Risellopsis varia</i>									D		Shellsand
<i>Rissoina sp.</i>									D		Shellsand
<i>Zeacolpus symmetricus</i>				D							Very common at wharf end of bay on low tide drift line
<i>Struthiolaria papulosa</i>				D							Sandy bottom washed ashore
<i>Sigapatella novaezelandiae</i>									D		Shellsand
<i>Crepidula monoxyla</i>				L							Inside mouth of dead shells
<i>Trichosinus inornatus</i>									D		Shellsand
<i>Uberella vitrea</i>									D		Shellsand

STEWART ISLAND
SHELL LIFE AROUND OBAN

NAME	Deep Bay Paterson Inlet	Vaila Voe Paterson Inlet	Lonnekers Halfmoon Bay	Horseshoe Bay beach	Horseshoe Bay low tide	Ringaringa low tide	Sandhill Bay Native Island	Ackers Point	Cow Island shell sand	Cow Island coast low tide	Comment
<i>Tanea zelandica</i>				D							Very large, on sandy bottom some still with animal/ operc
<i>Argobuccinum tumidum</i>				D							
<i>Xymene ambiguus</i>	L	L									On mud at low tide nice clathrate condition
<i>Xymene convexus</i>	L	L	L		L						V. common in Inlet clean condition elsewhere.
<i>Comptella curta</i>									D		Shellsand
<i>Lepsithais lacunosus</i>		L			L						On low tide rocks
<i>Paratrophon patens</i>						L	L				Amongst blue mussels, some pink
<i>Cominella nassoides</i>	L	L		D							Very common on mud at low tide clean pink/orange colourings
<i>Buccinulum pertinax</i>	L	L			L						Very common under rocks in Inlet various colours
<i>Buccinulum vittatum</i>	L	L			L	L					Very common under rocks in Inlet. Orange colours near Thurle
<i>Buccinulum pallidum</i>		L									Under rocks, uncommon
<i>Paxula transitans</i>									D		Shellsand
<i>Zemitrella sulcata</i>									D		Shellsand
<i>Alcithoe arabica</i>				D							Craypots or washed ashore
<i>Austromitra rubinosa</i>									D		Shellsand
<i>Neoguraleus lyallensis</i>									D		Shellsand
<i>Neoguraleus sinclairi</i>		L							D		Under low tide rocks
<i>Siphonaria cookiana</i>	L										
BIVALVIA											
<i>Nucula</i> sp.									D		Shellsand
<i>Mytilis edulis galloprovincialis</i>						L	L				
<i>Modiolarca impacta</i>				D							
<i>Pecten novaezelandiae</i>				D							
<i>Chlamys zelandiae</i>				D							
<i>Lasaea hinemoa</i>									D		Shellsand
<i>Cardita aoteana</i>									D		Shellsand
<i>Gari convexa</i>				D							Large, fine specimens
<i>Soletellina siliquens</i>		D		D							
<i>Ruditapes largillierti</i>				D							Large and heavy
<i>Myadora striata</i>				L							Large, some washed up live
<i>Hunkydora australica</i>											
<i>novozelandica</i>				D							

L= Live D= Dead

Cypraea - *Mauritia* - SOME COMMENTS

By Nona Browning

At a Club meeting sometime ago, amongst shells at the Sales Table were some *Cypraea* (*Mauritia*) about which some of us were uncertain. The following comments might help in naming them -

In about 1963 when first my son and I collected two of the commoner *Mauritia arabica* (Linnaeus, 1758) and *M. eglantina* (Duclos, 1833) it was not difficult to differentiate between them, but in later years some differences were less marked, e.g. dorsal colouring in *eglantina* whilst tooth size and number varied in both species. Concerning minor differences locality is often a factor, but most of our *arabica* and *eglantina* were collected around Suva Harbour and the south coast of Viti Levu. Hardly any of our shells now have labels giving dates, locality, tide etc. recorded at the time of collection.

Mauritia arabica, compared with *eglantina*, is flatter on base, darker patterned on the dorsum, sides more angulate, teeth fewer and coarser. However, one couldn't rely on teeth as a guide and, fortunately, there remains a certain distinction between these two species - *eglantina* always has a dark blotch near the spire, never present in *arabica*.

Perhaps a note about how the collection data came to be missing should be mentioned. When I was returning from Fiji to New Zealand some damage occurred to a container. Seams had opened slightly allowing water (not salty) to collect inside. This was in transit to Auckland (where the damage was most likely to have taken place but not proven), then to Palmerston North. Some shells were undamaged but almost all paper material such as books, family papers, photographs, shell packing, and, of course, the specimen labels were a write-off.

Our single collected specimens of the less common *M. depressa* (Gray, 1824) and *M. maculifera* Schilder, 1932 have still not been found in our unpacking!

Mauritia depressa is a neat shell like a small *arabica* but more round in outline with spots and n lines, sides very angulate, base flat and always white with few coarse dark teeth.

Mauritia maculifera is solid, rather ovate, dorsum brownish with clear white spots, sides angulate, teeth coarse. The base has a distinct brown blotch on about a third of the columellar side. On shells from other places the blotch seems to be slightly raised though I have not seen this referred to in print anywhere.

Another three *Mauritia* found in Fiji which are easily distinguished from the four just discussed are *M. mappa* (Linnaeus, 1758), *M. mauritiana* (Linnaeus, 1758), and *M. scurra* (Gmelin, 1791):

1. *M. mappa* has a unique pattern of the branched sulcus. Ours were hard to find initially until their particular habitat was known;
2. *M. mauritiana* is a large, heavy, very dark shell, ours being found on on rocky basalt inlets on the south coast of Viti Levu where there was little or no protection from the reef. This handsome shell has a blue-black base, most of our being a bit milky-blue partly because, although live-collected, they may have been damaged by water;
3. *M. scurra* is uncommon in Fiji. It is slender, cylindrical, delicately coloured, dorsum ashy blue with pale golden brown markings, and has a pale orange band above the margins. We found only one live shell.

[Editor's note: In the latest treatise on cowries, the lavish (and expensive) *A Guide to Worldwide Cowries* by Felix Lorenz, jr & Alex Hubert, 1993. Verlag Christa Hemmen, 571 p., *Cypraea* or *Mauritia mappa* is separated off in the genus *Leporicypraea* Iredale, 1930.]

COLLECTING PARYPHANTAS IN NEW ZEALAND DURING 1938

By Arthur Richardson

[This account written by an early member of the Auckland Museum Conchology Club originally appeared in Volume 1, Number 9, pp 135-136, 1 June 1946 of *Mollusca*, a short-lived (September 1944 to August 1949), shell magazine published and edited by Paul H. Reed of Tavares, Florida, U.S.A. Another version, entitled "Shell collecting - thrills and spills" subsequently appeared in the *Auckland Museum Conchology Club Bulletin* 3: 9-10, in December 1947. It still has considerable interest and relevance in our present age of land snail conservation!]

"It was during March, 1935, that I was invited to a shell club meeting. I affiliated myself with the organization and attended the meetings each month. It was here that I became interested in collecting shells and in *Paryphanta* in particular. The urge to collect these wonderful shells with the shining epidermis culminated in January, 1938, when I put a bed in my car, packed in food, petrol stove, water, collecting gear, tools, etc. On January 17, 1938, I left Auckland on a long trip into the South Island with great hopes of finding *Paryphanta*.

The first hunting was done at Levin in the North Island. I hunted and scratched like a good old hen, finally managing to turn up 16 snails after three days hunting. These were *Paryphanta traversi* Powell and are not easy to find. I was not too pleased at my first encounter with *Paryphanta*.

Leaving Levin, Cook Strait was crossed and arrived at Picton where *Paryphanta hochstetteri bicolor* Powell was supposed to be found. After some inquiries I was directed to the mountain behind the town. Much climbing and hunting was done at this station for two days with negative results. From here I moved on to Nelson being directed to Mt Doubles finding my way up to 3600 feet. After two days hunt I had a single half grown *Paryphanta hochstetteri* [i.e. *hochstetteri*] Powell to show for my work. So I went on to Takaka hill, the road rising to 3100 feet. Camp was made near some bush and later by working up to 3500 feet I collected 18 live and 10 empty shells of *Paryphanta hochstetteri* Pfr. From here I moved on to Onekaka climbing a ridge to an iron ore mine hoping to collect *Paryphanta fallax* Powell but found nothing worth carrying home although I saw approximately a hundred damaged shells. I met a family here who promised to send me some shells and the contact proved good as several small lots were later received after I returned home.

I returned to Nelson where I expected to meet Charlie Clarke, a beetle collector, who was expected by a certain boat but he failed to arrive, so I left a note of my itinerary. Moved on to Westport and up the coast to Seddonville. This is the habitat of *Paryphanta unicolorata* Powell, but after two days hunting I could not find a trace. So moved along the road to Karamea, staying at a roadman's hut on the roadside, five miles from the nearest house. Played cards until 1:30 A.M. next day!! My host, Jack Henrickson, showed me where I could get some shells which turned out to be *Paryphanta lignaria* Hutt., finding ten specimens.

Coming back to Seddonville, another roadman's two sons took me on a trip along the coast for eight and a half miles. A hut had been constructed of drift wood which was to be my home for three exciting days. I was dead tired when we arrived, the rugs were sort of sticky and there was plenty of company in the form of fleas but I was too tired for them to keep me awake. The next day we went another three miles up the coast to where the earthquake lifted the sea bottom up 300 feet. I went after a special Paua shell but could not find a single shell and came back to the hut even more tired than the day before, turning into the bunk at 7 P.M., being summertime and well south it was daylight until 11 P.M. The youngest lad said he would look for some snails in a patch of bush about three chains away. He was soon back saying he had found some. I would not believe him and told him he was pulling my leg. However, after emptying his

pockets he had twenty *Paryphanta lignaria* Hutt., on the floor. What a thrill!! My tired feeling left me at once - my dreams were of snails. Next day, the three of us went snail hunting and believe me I did get thrills and thrills. We were on a piece of virgin bush and in approximately three acres we collected 300 snails. These boys had been in this bush many times, yet had never noticed the snails in their travels.

Back to the car, I was told there was another crank like myself in the district. This was Charlie Clarke looking for me so I went along the Karamea road to look for him. While I was repairing the car at Jack Henrickson's hut he appeared in a service car. We went along in my car to Kohiahia River where we camped. Another roadman came along and after hearing what we were after, he took us to his camp over the river another four miles. The following day we went up the coast two miles to a ridge of virgin bush and at 1700 feet we found our first snail, *Paryphanta annectens* Powell. Talk about thrills!! We had them here and we had the reverse also. There were four of us in the party, the two roadmen, Charlie and myself. We lost Charlie. We called and called but could find no trace of him. The head roadman said better one lost than all lost, so we came out of the bush. It was a sigh of relief to me when Charlie finally found his way out after dark and showed up about 11:30 P.M. When we counted our catch Charlie had 250 and I had approximately 300. We left the roadmen at Kohiahia River and came back to Nelson, where Charlie left me.

I went back through Takaka on to Collingwood and met the two roadmen on the other end of the track which crosses the Goaland [i.e. Goulard] Downs staying in a log hut, the first time I had ever seen one. On account of the heavy rains which swelled the rivers we had to cross, we were forced to stay at this place a week. At last we were able to get away with pack horses and after 24 miles came to the hut on the Goaland Downs. Here we were at the habitat for *Paryphanta janseni* [i.e. *jamesoni*] Powell. They were scarce but managed to get about twenty-five. A little further along we found *Paryphanta monatae* [i.e. *mouatae*] Powell being somewhat harder to find and securing twelve specimens. I expect they are there if one could find their hiding place. Had I been there in April and May the snails would be out and active.

Paryphanta shells are found in different ways according to the locality. *Paryphanta rossiana* Powell is found in wet moss on top of Mt. Greenland. *P. fallax*, *P. hockstetteri*, *P. lignaria*, *P. traversi*, *P. gilliesi*, *P. annectens* and *P. busbyi* are found among stones, under logs, leaves or any cover. *P. monatae* seems to be in wet places. The eggs are laid singly here and there and have shells like birds' eggs. The snails do not gather in clusters like the garden snail but are scattered.

I had hoped to collect 1000 snails on this trip, but came home with approximately 800 specimens that I had collected or given me. I was away three months and the car registered 3000 miles while I walked about 200 miles. All in all, it was a wonderful trip, long to be remembered and full of the joys of collecting."

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THE TERMINAL GENITALIA OF *Rhytida otagoensis* Powell, 1930: IMPLICATIONS FOR UNDERSTANDING COPULATORY BEHAVIOUR IN NEW ZEALAND RHYTIDID SNAILS (MOLLUSCA: PULMONATA: RHYTIDAE)

By Frank Climo & Karin Mahlfeld

ABSTRACT

The everted and retracted terminal genitalia of specimens of *Rhytida otagoensis* Powell, 1930 (Rhytidae) collected from Waitutu Forest, Southland, New Zealand in October 1985 are illustrated. Sperm transfer probably takes place in the everted spermatheca. This type of sperm transference may also occur in other rhytidid snails where so much of the body cavity is occupied by the relatively huge buccal mass and salivary glands typical of such carnivores, and where the male organs are often vestigial.

INTRODUCTION

Of eight perfectly preserved specimens of *Rhytida otagoensis* Powell collected from Waitutu Forest, Southland, in October 1985 by Mr G. Mason (Dunedin), three of them had terminal genitalia partially or completely everted. This provided the rare opportunity to compare genitalia in the retracted and everted states within a single species, the specimens collected within days of each other. The observations made below explain the heavy retractile musculature on the atrium, spermatheca and vagina of most rhytidid snails (Climo, 1977: fig. 2A-C).

DESCRIPTION OF TERMINAL GENITALIA OF *Rhytida otagoensis*

Retracted state - Figure 1. Penis strongly muscular, strap-like, retractor muscle terminal. Vas deferens entering lumen about one-third way down from apex; interior of penis with about 20 longitudinal ridges, these divided into angular structures that nestle together like paving stones, with their pointed ends facing down lumen. Ridges rapidly simplifying within the entrance to vas deferens from penis lumen. Atrium very short; spermatheca short, fleshy, about as long as penis, running continuous with vagina, with strong retractor muscles on sides and apex. Vagina and spermatheca longitudinally folded by weakly branching fleshy ridges that send branches into simple entrance to oviduct; vagina/spermatheca and penis open via distinct pores into wide atrial area. Vas deferens strongly muscular for most of its length, internally with about five longitudinal ridges, the ridge interspaces occupied by irregularly spaced granules.

Everted state - Figure 2. All organs of terminal genitalia everted from the oviduct downwards. Penis most anterior and most ventral of organs, curving posteriorly, multibarbed by the ornamented longitudinal ridges, subterminal opening to vas deferens on the dorsal surface. Spermatheca curving posteriorly with slit-like opening facing dorsally midway between sole and mantle edge, inflated, fleshy, surface covered with fine granules; oviducal opening most dorsal, tucked against mantle edge.

DISCUSSION

In an earlier paper (Climo, 1977), the Rhytidae was divided into two subfamilies on the basis of the structure of the terminal genitalia: Rhytidinae Pilsbry, 1893, for snails with a well developed penis and spermathecal duct; Paryphantinae Godwin-Austen, 1893, for snails with a vestigial penis and no spermathecal duct. It was suggested (Climo, 1977: 64) that the paryphantine condition was derived from the rhytidine.

Rhytida otagoensis is a rhytidine snail whose terminal genitalia are more compacted than illustrated for *R. greenwoodi* (Gray) by Climo (1977: fig. 2E). In *R. otagoensis* the spermatheca

is very short and has no obvious stalk, the vagina is shorter and the vas deferens entry is more strongly subterminal on the penis than in *R. greenwoodi*.

Although retractor muscles were illustrated on the female parts of the terminal genitalia of *Rhytidarex* (*Amborhytida*) *pycrofti* (Powell) (fig. 1A-B), *R. (R.) johnsoni* (Powell) (fig. 1D-F), *Schizoglossa novoseelandica* (Pfeiffer) (fig. 2A), *Powelliphanta gilliesi* (Smith) (fig. 2D), *Rhytida greenwoodi* (Gray) (fig. 2E), and *Rhytida* (*Wainuia*) *urnula* (Pfeiffer) (fig. 2F) in that earlier paper (Climo, 1977), the significance of these muscles was not understood at the time. They were almost certainly there to withdraw the everted structures after mating.

It appears probable that the spermatheca is the sperm deposition site in *Rhytida otagoensis*. The spermatheca in carnivorous rhytidids - witness *R. otagoensis* above - is probably a copulatory surface only and not a gametolytic gland for digesting sperm. In many herbivorous pulmonate snails the need for extra protein to facilitate egg production is thought to be partially met by the digestion of sperm in the structure traditionally called a spermatheca (Tompa, 1984). The ingestion of a worm or another snail at the appropriate time is all that is required in carnivorous snails. In New Zealand rhytidids the terminal genitalia are quite minute relative to other organs in the anterior part of the haemocoel (the reverse is found in herbivorous punctoid snails). This anterior region is occupied nearly totally by the massive buccal mass, its retractor muscles and salivary glands. Thus the feeding and copulatory behaviour of rhytidid snails are co-constructed.

External sperm exchange has been recorded for at least four other groups of pulmonates: Limacidae, Discidae, Succinidae, and Polygyridae (Emberton, 1994). Although everted genitalia have not been recorded for other New Zealand rhytidids, the widespread distribution of atrial, vaginal, oviducal, and spermathecal retractor muscles strongly suggests that external copulation is the norm. The similarity of the terminal genitalia of *Powelliphanta* and *Rhytida* (*Wainuia*) species to the condition in *Rhytida otagoensis* suggests similar copulatory mechanics for all of them. It is not yet possible to say how the simplified terminalia of the paryphantine snails function during copulation but the vestigial penes in some species (e.g. *Paryphanta busbyi*) makes it imperative (for mechanical reasons) that copulation takes place on everted structures.

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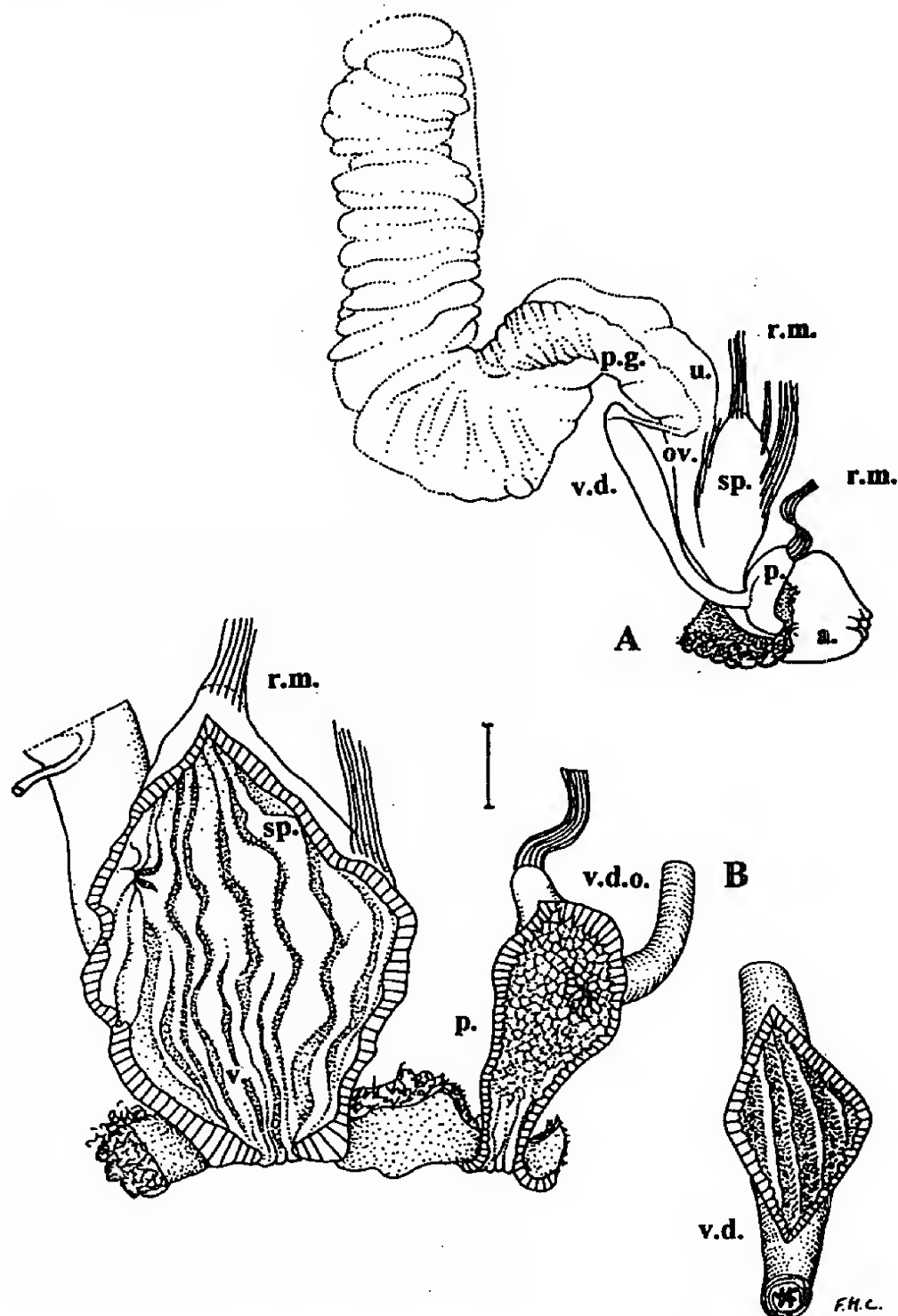


Fig. 1. A, anatomy of *Rhytida otagoensis* Powell in retracted state, abbreviations: a., atrium; ov., oviduct; p., penis; p.g. prostatic gland; r.m., retractor muscle; sp., spermatheca; u., uterus; v., vagina; v.d., vas deferens; B, internal structures of vas deferens, spermatheca/vagina and penis, abbreviations as in A, scale line = 1mm.

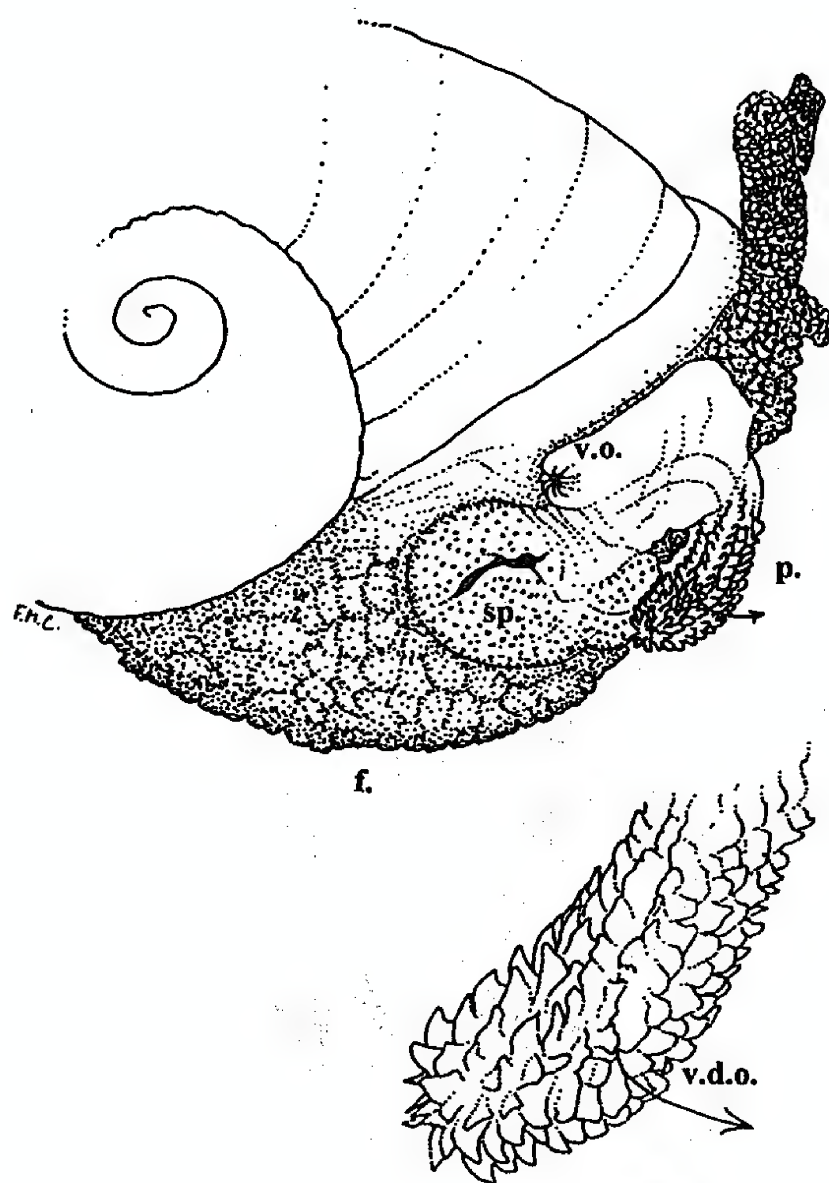


Fig 2. Everted genitalia of *Rhytida otagoensis* Powell, abbreviations: f., foot; p., penis; sp., spermatheca; v.o., vaginal pore; v.d.o., vas deferens entrance.

THE TRIALS OF BEING A PIPI IN PEGASUS BAY

By Elliot Dawson

[During the late 1950s what we used to call the New Brighton pipi (actually a tuatua although we never used that word in those days) was being reported as becoming increasingly hard to find along the beaches of Pegasus Bay. It was always a great favourite for fishing bait and for eating on its own ... so it was causing some concern that it was reputedly becoming scarce. The Canterbury Progress League of that time came up with the novel idea of stocking the beach with toheroas. I had, myself, predicted a visible decline in "pipi" numbers and I wrote the following account of the basis of my view - this appeared in the Christchurch morning paper, *The Press*, of Saturday 12 November 1960. I think the study is still of interest in relation to our attempts to understand the fluctuations of marine populations (notably the phenomenon of resurgence¹) - not always due to pollution or man-made activity ...]

"THE TRIALS OF BEING A PIPI IN PEGASUS BAY.

TOHEROAS WOULD ALSO FACE HEAVY ODDS

Specially written for "The Press" by E.W. Dawson.

The Canterbury Progress League must be commended on its initiative in trying to have the Waimairi beach stocked with toheroas. But local gourmets will be disappointed to learn from the Minister of Marine (Mr W.A. Fox) that there is little likelihood of their being able to satisfy their palates with succulent toheroas grown so near home.

I feel that I may be able to offer some words of consolation to the Progress League about the fate that might await a toheroa on the shores of Pegasus Bay.

It was one of my most enlightening experiences some years ago to carry out an investigation into the distribution, growth and habits of the toheroas's little brother, the pipi, or tuatua as some prefer to call it.² Both these animals belong to a group or genus of shellfish now known as *Donacilla* but, according to the scientist's interminable habit of changing names, formerly called *Amphidesma* or *Mesodesma*.

The problem of the number of varieties or "breeds" of toheroas and pipis is still being investigated;³ but to those who are more concerned with their edible attributes their common names will suffice to recall their qualities.

From an observation by Professor Percival,⁴ it seemed that as one went further north along Pegasus Bay from Sumner the pipis became smaller, and this prompted the question of how this could have come about.

Over a period of nearly two years and a half I carried out monthly sampling of the pipi populations at a series of localities at 1000-yard intervals along the 30-mile stretch of the Canterbury beaches. Studies were made of the number of individuals making up each population and their variation in size, and it was possible from examining the growth rings on the shell to estimate the ages of the individual animals.

The eggs of the female pipis were successfully artificially fertilised and attempts were made to grow the young animals in laboratory tanks so as to follow each stage of the life history.

SURPRISING RESULTS

Observations were made on hazards confronting the young pipi on the beach, the influence of predacious sea gulls, crabs and fish, as well as the natural changes in the shape and composition of the beach and the offshore currents and drifts.

All this led to some surprising results. It was no easy task being a pipi. The so-called "struggle for existence" was very real. Each individual pipi which we find on the beach is certainly lucky to have found a resting place.

Such research had a number of useful features. From the purely personal aspect it showed that there was very much more to the simple facts of nature than one might casually suppose. A single observation, as Professor Percival had made, opened a gate to a whole new world which might not otherwise have been found. Pegasus Bay proved to be a natural out-door laboratory. Thus, the study of the currents and changes in the beach are of interest, beyond the biologist, to those concerned with the disappearance of the sand at Sumner, or with how the South Brighton spit builds up, or what happens to the water flowing out of the estuary, and even where and when holes and rip currents treacherous to bathers might be found.

In an even more direct way the possible fate of toheroas transplanted to the Waimairi beach could now be predicted with some certainty. Apart from the fact that the toheroa is a good deal less tolerant of its surroundings than the pipi, the stretch of beach selected by the Canterbury Progress League has little to recommend it as a safe home for toheroas, even if their requirements were met with in other ways, and they would have a considerable struggle to maintain themselves in their ever-changing surroundings.

PIPI POPULATIONS

A few of the findings from my investigations may serve to show some of the surprises that await the unbiased observer of the simple phenomena of nature.

In 1954 the total population of pipis along Pegasus Bay, ranging from the small "spat", the newly-settled young pipis hatched from the eggs of the season, to the long-established pipis of two or three inches in length, and of up to 10 years old, was estimated at the astonishing figure of 1770 million.⁵ This is not quite so astonishing when one finds that a single female pipi may be carrying 30 million eggs during the breeding season - an insurance against the tremendous losses after hatching. These eggs are shed into the sea where they are fertilised by sperms from the male pipis. The fertilised eggs develop into feebly swimming larval stages known as veligers, which lie at the mercy of tides, currents and drifts, as well as predatory animals, for about two weeks. If they have avoided death in the numerous ways that surround them they will settle down in the sand of the nearest part of the beach where the currents have swept them. Here they will increase in size from their tiny larval shells of about one-hundredth of an inch, over four or five years, to become the full-sized pipis known to everyone who visits the sea shore.

The investigations showed that distinct populations of size and age had formed at distinct localities and that these seemed to have formed in a random manner.

STUDY OF CURRENTS

Ocean currents were thought to be largely responsible for carrying the larvae to the particular beaches along the shores of Pegasus Bay where the oddly-assorted populations occurred. It would therefore be useful to map the currents in Pegasus Bay. Unfortunately very little was known of the movement of the surface waters of Pegasus Bay, and it was necessary to study this by releasing hundreds of drifting bottles and cards in plastic envelopes at various fixed places in the sea.⁶ The officers of the inter-island steamer express and of the R.N.Z.A.F. at Wigram very kindly co-operated in this venture. Their efforts, together with releases from the New Brighton pier and other vantage points made with the help of a R.N.Z.V.R. motor-launch, gave a complete coverage of Pegasus Bay leading to a period in 1955 when the whole of the bay must have seemed covered with these floating markers. Other help was given by pilots of the National Airways Corporation who sketched the outflow of discoloured water from river mouths as a guide to conditions in the sea.

Through the kindness and interest of many Christchurch people, whose help I very much appreciate, a good understanding of the movements of the water was reached and the importance of this on the fate of the very young pipis was confirmed.

The populations of pipis could be analysed into the age-groups or numbers of individuals hatched in a particular year composing them. It appeared that on some beaches certain years were not represented at all while the populations of years that were represented differed greatly from one beach to another.

The settling of the young forms of such shellfish on the beach is called a "spatfall," and the peculiarities of the various populations showed that in some years there had been no spatfall at certain places, or that there had been an insufficient spatfall to establish a population.

YEAR-GROUPS ANALYSED

For example, the following year-groups were found after the 1954 breeding season "spatfall" had taken place at these beaches: Amberley, 1952-1949; Leithfield (north end), 1951-1949; Leithfield (south end), 1951-1946; Woodend, 1954, 1948-1945; New Brighton, 1954, 1947-1944; Okain's Bay, 1954-1945.

The main feature contributing to this curious pattern was the effect of the various off-shore surface currents in which the young pipis floated, largely controlled by the whims of the prevailing winds during their fortnight or so of free life.

In a sheltered Banks Peninsula bay, such as Okain's Bay, these water movements were much more enclosed and the drift of the larval pipis was controlled to a greater extent; hence all the year-groups were represented in the total population. In contrast there had been no successful spatfall at New Brighton since 1947 although plenty of pipis could be collected there. The two ends of Leithfield beach showed distinct populations also. Such results are of very great importance in commercial fisheries, since by knowing the age composition of the populations being exploited one can predict something of the time necessary for replacement of the animals caught.

There were certainly plenty of free larval pipis in the water off New Brighton. I spent one Easter on the end of the pier with a centrifugal pump collecting vast numbers of veligers out of the surface layers of the sea by passing the water through a very fine silk net. The winds played havoc with them, driving them offshore towards the deeper sea and strong oceanic currents, or towards the rocky coasts further north where they would have no chance to settle.

This dependence on the wind moving the surface waters was amply confirmed by the results of the returns of drift bottles and cards. In strong south-westerly winds, bottles and cards dropped off the New Brighton Pier were carried right out of Pegasus Bay to the Kaikoura coast, to Tory Channel, to Castlepoint on the Wellington east coast, and to the Chatham Islands. With easterlies and north-easterlies prevailing the surface waters carried the bottles and cards back to the beaches from the Waipara river to Sumner. A comparison of the wind records of the Meteorological Office for the years of successful and unsuccessful spatfall showed an annual variation related to the presence or absence of these year groups in the populations.

DRIFT RELEASES

The results of these drift releases are still coming in. Perhaps the most spectacular was that of a bottle dropped in March 1953 from the ferry steamer Hinemoa. It had a start on the others for it was released 50 miles off Godley Head opposite Point Gibson (near Gore Bay) and so barely within Pegasus Bay. It travelled as far as the tip of Cape York Peninsula, Queensland, where it was found in September, 1960. Our knowledge of water movements in Cook Strait, and the recovery of other bottles from Pegasus Bay, suggest that the Queensland bottle travelled up the

west coast of the North Island to the North Auckland Peninsula and was carried across the sub-tropical zone of water to join the north part of the East Australian current.

Such recoveries, even after so many years, are still of considerable value to the oceanographer concerned with the study of ocean currents.

In spite of these discoveries there remains much to be found out about the life in our waters of such marine animals as the pipi, paua, scallop, mussel, or oyster. And what is found to be true for one part of New Zealand may not be so far other parts. It is as well to realise that about the habits of these animals we know virtually nothing, particularly by comparison with our knowledge of agriculture, sheep farming or dairy farming.

We should not be so eager to earn dollars from America, or to satisfy our own gastronomic cravings that we deplete the natural populations of sea creatures by rapid and unscientific exploitation. Only after we know how these animals grow as individuals and populations, and what the natural hazards are with which they have to contend, and when we have, ourselves, adopted a sensible attitude to what we want to do with them and for how long, should we attempt such commercial or economic undertakings. Farming of food from the sea certainly is possible; but we must study and control it as much as does the farmer on the land.

Scientific research of this sort takes a considerable time, as the Marine Department's own studies on the toheroa show, and we should beware of those who base their knowledge of the commercial possibilities of our marine fauna on mere hearsay."

NOTES

1 Coe (1946: 92, 93) had earlier pointed out in his explanation of an unprecedented surge in abundance and distribution of the California bay-mussel that: "Because of the instability of the environmental conditions associated with the variable chances of receiving a continuous supply of young individuals, the littoral marine community is subject to extensive alterations from year to year and even in many cases from month to month ..." and how "For some species of pelecypods [bivalves] an irregular periodicity has been observed in which the population seems to disappear locally for a number of years, to reappear later in almost incredible numbers." Later Coe (1953a, b, 1956) developed this theme for other species of bivalves, linking it also with dependence on ocean currents and tidal currents. He noted: "A curious departure from the usual local fluctuations in the populations of marine invertebrates is the sudden appearance of a resurgent population in which the numbers may be hundreds or thousands times larger than in the immediately preceding or following years. On sandy beaches in several parts of the world are species of bivalve mollusks belonging to the genus *Donax*. Some of these species occasionally experience an enormous increase in the numbers of individuals constituting a local population for one to three years and then return to their former numbers or disappear completely in that locality. The cause or causes which are responsible for their resurgences can seldom be found." Further, he concluded that: "... resurgent populations of marine littoral invertebrates in any locality depend upon a combination of the following circumstances: (a) a large spawning population at that locality or at some other place not too many miles distant; (b) suitable conditions during the period of pelagic larval life; (c) favourable currents which may bring the swarms of larvae to that locality at the exact time when they are ready for metamorphosis to the adult form and settling in or on the substratum; and (d) adequate opportunities for continued growth." And a helpful word for to-day's managers of coastal resources - "As a consequence of these currents, local conservation measures usually have little influence on the subsequent populations of that immediate neighbourhood, although they may benefit some other locality to which the larvae may be carried. In order to be effective in any one locality it is therefore necessary that the conservation should include a sufficiently large extent of coast line to insure that each locality may supply larvae to the others. Only occasionally will a large supply of the larvae be returned to their place of origin."

The Pegasus Bay situation was a classic example of a kind of resurgence. Indeed, I subsequently corresponded with Coe (who was then 89 but very generous to me) about this matter - which proved to be of mutual interest and satisfaction (as recorded 40 years later! - Dawson, 1996).

2 See Dawson, 1954 & Dawson, 1959b.

3 My Pegasus Bay shells appeared to be rather more posteriorly-elongate, more deeply-rounded anteroventrally, and lacked a marked central ribbing on the posterior slope - clearly distinguishable from the worn valves of larger shells washed across from the bays of Banks Peninsula such as Okains where such large ones could be found living and looking like what we called "*forsterianum*" from further south. A.W.B. Powell told me at the beginning of my study that my shells were a new species - such were the times! I later gave a hurried (although I had handled over 35,000 specimens) and rather naive interpretation of "*Amphidesma*" in New Zealand (Dawson, 1959b). Since then, with the advent of sophisticated mathematical methods (Richardson *et al.* 1982) and electrophoretic analyses (Smith *et al.* 1989) combined with more traditional morphological and taxonomic scrutiny (Beu, 1971; Beu & de Rooij-Schulling, 1982), we now have a more clearly-based knowledge of the identity and relationships of the four species, one-time of "*Amphidesma*", comprising the genus *Paphies* in New Zealand waters (it still doesn't tell us how they came to be that way - either in time or space). The New Brighton Pipi ("tuatua" if you wish) is now called (*vide* Spenser & Willan, 1995) *Paphies donacina* (Spengler, 1793). The relative geographic distributions of the two species of tuatua currently recognised, *P. donacina* and *P. subtriangulata* (Gray, 1828), along the New Zealand coastline is still of great interest - to me at least - especially where sympatric overlapping occurs. Despite mathematics and electrophoresis, there are still questions to be answered!

4 Professor of Biology at Canterbury University College (later the University of Canterbury, and the Chair of Zoology) from 1928 to 1959 - see Dawson, 1959a).

5 Although my methods of the time were relatively uncomplicated compared with more recent ways of assessing bivalve populations on New Zealand beaches (e.g. Millar & Olsen, 1995; Carbines, 1997), I believe my figures to be well-founded (Coe, 1953, noted a resurgent population of *Donax Gouldi* in California "numbering 20,000 individuals per square meter one year after arrival and extending in a band 2 to 5 meters wide for 5 miles ...").

6 For a more detailed view of this aspect see *Christchurch Star-Sun*, 18 April 1953.

As a postscript I can add that we had, in fact, become interested in the ecology of the tuatua many years ago during excavations which we did in an early Maori occupation site at Redcliffs on the south shore of the Christchurch estuary where to-day the pipi *Paphies australis* is so common. Here, as we noted (Dawson & Yaldwyn, 1975: 214), "The majority of the shellfish remains were of the estuarine pipi, *Paphies* (*Paphies*) *australis* (Gmelin) [formerly *Amphidesma australe*] and the cockle *Chione* (*Austrovenus*) *stutchburyi* (Gray). Shells of the estuarine mud snail *Amphibola crenata* (Gmelin), the paua *Haliotis* (*Paua*) *iris* Gmelin, and the shield-slug *Scutus breviculus* (Blainville) also occurred but not in significant quantities." Similarly, excavations in the nearby Moa-Bone Point Cave (Yaldwyn, 1975) revealed *Paphies australis* as "very common". Interestingly, in 1872, Haast found "numerous" *P. australis* (then called by him *Mesodesma chemnitzii*) in the Upper or Maori Deposits but not in the Lower or Moa-hunter Deposits. In contrast, what Haast called *Mesodesma cuneata* (presumably *Paphies donacina*) was "numerous" in the Upper Deposits as well as being "present" in the Lower Deposits and, additionally, in the Marine Sands beneath, characteristic of an open sandy beach. As Trotter (1975: 207) concluded: [from] "... the available evidence - artifactual, faunal and radiocarbon - it seems likely that the principal prehistoric occupation of the whole of the Redcliffs area took place during a single period of time which has a radiocarbon age of about six hundred years before present. There is no conclusive evidence of any major dietary or cultural changes having taken place during that period of occupation, which in terms of diagnostic artifacts and faunal midden remains is considered to be "early" (= "Moa-hunter" or "Archaic")." However, I should say that it is surprising that with the abundance and availability of to-day's tuatuas on the nearby open sandy beach (admittedly situated, inconveniently, across an estuary), the early human inhabitants of Redcliffs chose to feed on the estuarine pipi (which, it should be remarked, was present in the midden as a much more robust shell, like those from the Auckland Islands, than to-day's live populations). Yet, at some time, the cave-dwellers had a brief change of diet, as evidence by Haast's records of "*Mesodesma cuneata*". On the other hand, the geography of the Redcliffs area may have once been such that it was physically easier to collect tuatuas from a then closer sand beach such as to-day's Sumner beach (where I did find tuatuas at one time). All this all poses some further questions to follow up.

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TURBINIDAE (TURBAN SHELLS):

NOTES FROM A STUDY GROUP ON 28 AUGUST 1997

By Pat Lakeman

Around the world ...

A large family of top-shaped shells, usually with thick shell, an iridescent interior, and with a shelly operculum that seals the aperture. Several hundred species are known, most from tropical seas. Most species are vegetarian, feeding on marine algae.

- R. Tucker Abbott & S. Peter Dance, *Compendium of Shells* (73 species of Turbinidae illustrated).

A large family of several hundred species which are divided amongst 3 subfamilies -

- * Angariinae (dolphin shells)
- * Turbininae (true turbans)
- * Astraeinae (star shells).

Angariinae are a small group of relatively large shells with spiral ornamentation. Some have long curved spines. *Angaria* is the only genus, and all are collectors' items.

Turbininae tend to have solid top-shaped shells with large body whorls and apertures. Genera include *Turbo*, *Ninella*, and *Lunella*.

Astraeinae are popular and varied collectors' shells which are generally conical to top-shaped with flat bases, often highly ornamented with long spines. The main genera are *Astraea*, *Bolma*, and *Guildfordia*. Most species are vegetarian, and usually prefer warm shallow water. g oteri

- Kenneth Wye *The Encyclopedia of Shells* (44 species of Turbinidae illustrated).

In New Zealand ...

In his 1979 manual *New Zealand Mollusca - marine, land and freshwater shells*, A.W.B. Powell describes the New Zealand Turbinidae as " ... resembling the Trochidae, but always with a calcareous operculum. Mostly large heavy shells with rounded whorls. Aperture nearly circular, with a tightly fitting operculum, heavily calloused on the outside, flat, spirally whorled and chitinous covered on the inside."

Powell goes on to describe -

- * *Turbo smaragdus* and *Turbo granosus* in the genus *Turbo*, subgenus *Modelia*,
- * *Astraea heliotropium* in the genus *Astraea*, subfamily Astraeinae;
- * *Cookia sulcata* in the genus *Cookia*, subfamily Astraeinae;
- * 8 species of *Homalopoma* (*crasscostata*, *fluctuata*, *imperfurata*, *micans*, *nana*, *rotella*, *umbilicata*, and *variecostata*) in the genus *Homalopoma*, subgenus *Argalista*, subfamily Homalopomatinae).

Subsequent checklist compiled by H.G. Spenser & R.C. Willan as "The Marine Fauna of New Zealand: Index to the Fauna: 3. Mollusca" divides the New Zealand Turbinidae into the subfamilies Turbininae and Colloniinae.

Turbininae contains *Astraea heliotropium*, *Bolma recens*, *Cookia sulcata*, *Modelia granosa*, and *Turbo smaragdus* - the name changes here are straightforward to follow.

Colloniinae contains the same 8 species of *Homalopoma* as in Powell with no name changes.

The New Zealand Turbininae are all quite large shells but the species of *Homalopoma* in the Colloninae are relatively minute, in the 1 to 4 millimetre range for both height and width.

New Zealand's cat's eye, *Turbo smaragdus*...

References to *Turbo smaragdus* in *The Seas around New Zealand* by Kim Westerskov & Keith Probert include "At Shag Point in North Otago are the remains of a site occupied during the mid 16th century. Excavation of bone and shell remains in middens reveal diet including ... cat's eye, *Turbo smaragdus*..." (Note - Wye describes *Turbo cornutus* (the Horned Turban) as "an important seafood in Japan" - so perhaps our Turbos are tasty eating ... anyone tried them? *Smaragdus* means "emerald" with reference to the green and white operculum of the cat's eye. The youngest cat's eyes are spirally ridged.

Wellington Shell Club's logo - the Cook's Turban ...

Cookia sulcata is the Wellington Shell Club's signature shell; it is represented on the front of our Club journal *Cookia*, and sometimes on our monthly newsletters (when there's a bit of space!). A stylised Cook's Turban was used as the logo for our first National Shell Show in 1995, and the competitions in that show included a special class dedicated to *Cookia sulcata*.

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TITAHI BAY REVISTED

By Jill Burnet

On Easter Monday of 1995, six of us went collecting along the Titahi Bay coast, around the Green Point area as far as Open Bay. An account of this was published in *Cookia* 7 (2): 37-387. Two and a half years later, on Sunday 20 September 1997, we went back to the same area. Of the original six there were Jenny and myself, and this time we were joined by Deidre and Digby, their daughter Nadine, and the most important member of the Standish family, Kane. Although it had been rather a dubious morning, it was brilliantly sunny as we scrambled down the track to the beach. Our first impression was that there were not nearly as many shells washed up as last time, especially fresh ones. There were piles of pauas in places, and cookias and large dog cockles, very bleached and beach worn, above the high tide mark. We did find some pairs of the large dog cockle with quite nice markings though not a very big size - this is a particularly good place for this species. Jenny ventured out on the rocks and found some *Scutus* live, which we hadn't seen last time. Other species which we saw live were paua, cat's eye, *Cominella maculosa*, *Melagraphia aethiops*, *Cellana denticulata*, and the ubiquitous little blue periwinkle. Jenny noticed an unusual and attractive striped anemone which she described to us. On the way back, Jenny and I stopped to scabble in some shell sand, and turned up *Zeacumantus subcarinatus*, the brown periwinkle, *Marinula filholi*, *Notacmea helmsi*, *Xymene traversi*, *Neoguraleus sinclairi* and *N. lyallensis*, *Risellopsis varia*, *Borniola reniformis*, *Diloma arida* and *D. nigerrima*. These are not on our 1995 list, probably for the very good reason that the shell sand collected on that trip is still sitting undisturbed in its bag, gathering dust in Jenny's basement. Apart from these, the species we found this time but not in 1995 were *Struthiolaria papulosa*, *Ruditapes largillierti*, *Cantharidus opalus*, *Semicassis pyrum*, and *Dosinia maoriana*. Altogether, we found about 55 different species, not as good as the 80 plus found in 1995, but that's the luck of the day. We all enjoyed the walk and although Kane covered at least six times as much ground as anyone else, he seemed quite reluctant to go home. I'm sure he would gladly set out all over again!

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MINUTE SPECIES OF MOLLUSCA FROM TITAHİ BAY

- an historical study by T. Iredale & M. Mestayer

In the Proceedings of the Wellington Philosophical Society [subsequently the Wellington Branch of the Royal Society of New Zealand and now known as "Science Wellington"] as published on page 559 of Volume 40 of *The Transactions and Proceedings of the New Zealand Institute* [subsequently The Royal Society of New Zealand] there is a note of a paper entitled "Additional List of Mollusca: Minute Species found in Sand from Titahi Bay, New Zealand," by T. Iredale, Christchurch, communicated by R.L. Mestayer, for Miss Mestayer. The abstract, presumably written by Miss Marjorie K. Mestayer, conchologist of the then Colonial Museum [now Te Papa, Museum of New Zealand] reads as follows -

"The accompanying list contains a number of minute species of Mollusca which were found by T. Iredale in some Titahi Bay sand which I sent him. These were not included in the list published in the Transactions last year [??? this must refer to vol. 39 ... but no relevant papers in it by either Iredale or Mestayer]: *Purpura scobina*, var. *albomarginata*, Desh.; *Trophon plebeius*, Hutt. (?), Jg.; *Lutonna mauritiana*, Lam.; *Cominella lucida*, Phil. (?), Jg.; *Risellopsis varia*, Hutt.; *Trochus traratus* [sic], Q. and G., Jg.; *Mytilus canaliculus*, Martyn; *Modiolaria barbata*, Reeve; *Leiostraca murchisoni*, Hedley; *Caecum digitulum*, Hedley; *Rissoa incidata*, Trauerfeld; *Rissoa foveauxiana*, Suter; *Rissoa microstriata*, Murdoch; *Rissoina agrestis*, Webster; *Incisum lytteltonensis*, E.A. Smith; *Scissurella rosea*, Hedley; *Liotia polypleura*, Hedley; *Schismope brevis*, Hedley; some minute bivalves not yet satisfactorily placed, perhaps *Cura* [sic] *delta*, Tate and May, and *Thilobrya* [sic] *costata*, Bernard."

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SOME RECENT PAPERS BY BRUCE MARSHALL

1996a: Molluscan and brachiopod taxa introduced by F.W. Hutton in *The New Zealand Journal of Science. Journal of the Royal Society of New Zealand* 25: 495-500.

1996b: A new family of Addisoniidae associated with cephalopod beaks from the tropical south-west Pacific, and a new pseudococculinid associated with chondrichthyan egg cases from New Zealand (Mollusca: Lepetelloidea). *The Veliger* 39: 250-259.

1996c: Seep faunas and other indicators of methane-rich dewatering on New Zealand convergent margins. *New Zealand Journal of Geology and Geophysics* 39: 181-200 (with K.B. Lewis).

1996d: Molluscan name-bearing types in the Museum of New Zealand Te Papa Tongarewa. *Tuhinga* 9: 1-85.

1997a: Recent molluscan name-bearing types in the Canterbury Museum, Christchurch, New Zealand. *Records of the Canterbury Museum* 11: 17-41 (with A.N.D. Freeman, P.A. Maxwell, M.W. Walker, and D.C. Nicholls).

1997b: A luminescent eulimid (Mollusca: Gastropoda) from New Zealand. *Molluscan Research* 18: 69-72.

1997c: Pectinidae and Propeamussidae (Mollusca: Bivalvia) from Norfolk Island and the Kermadec Islands. *Molluscan Research* 18: 73-114 (with H. Djikstra).

OTAKI - NOT A COLLECTOR'S BEACH!

By Jill Burnet

The only beach I've been able to visit regularly for the last six years has been Otaki Beach. My parents lived there until early this year, and every time I visited them, usually for a weekend, I took the dog for a walk on the beach, morning and evening. Well, it's a great beach for walking dogs but, unfortunately, not inspiring for the shell collector. At first sight it seems hopeful - there are plenty of shells along the tide lines and old bleached valves washed higher up. However, closer inspection shows that they are predominantly *Dosinia anus*, interspersed with *Spisula aequilatera*. There are often fresh *Semicassis pyrum* with good markings, sometimes nice *Alcithoe arabica*, and every so often a wash up of *Spirula spirula*. And that's about it! The following list is what I found over the weekend of 22-23 February 1977, and is fairly typical of what is usually there, in fact probably a bit better than usual. I collected in the area from the Surf Club northward, as far as the small stream that comes out to the sea by the plantation of trees.

Calliostoma punctulatum
Calliostoma selectum
Struthiolaria papulosa
Struthiolaria vermis (fossil)
Semicassis pyrum
Dicathais orbita
Austrofuscus glans
Alcithoe arabica
Amalda australis

Perna canaliculatus
Atrina pectinata zealandica
Macra discors
Spisula aequilatera
Paphies subtriangulata
Paphies ventricosa
Bassina yatei
Dosinia anus
Dosinia subrosea

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CONGRATULATIONS!

At our recent Annual Meeting fellow Club members extended their hearty congratulations to Dr Alan Beu on his being elected a Fellow of the Royal Society of New Zealand. This is a very great honour not only for Alan himself, whose years of dedicated research have been rewarded, but for due recognition of the worth of the both Conchology and Palaeontology. Newer members will see from the recently published Index to the Club's publications how very helpful Alan was to the Club in the days of our regular Study Groups. Well done, Alan!

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ECOLOGICAL NOTES ON MOLLUSCS IN A RED ALGAL (CORALLINACEAE) COMMUNITY AT ISLAND BAY, WELLINGTON

By G.R.F. HICKS

Investigations on the fauna associated with marine algae have been mostly confined to the North Atlantic. Little has yet been done in New Zealand.

The purpose of the work now done at Island Bay was to show the local faunal composition of a red (or corallinacean) algal community and to compile a species list with brief ecological notes on their occurrence, behaviour and feeding, as well as, where possible, certain seasonal and zonal fluctuations. Collections were made from sheltered mid-littoral *Corallina officinalis* and exposed sublittoral *Corallina hombronii*, *Cheilosporum corymbosum*, *Amphiroa* (*Cheilosporum*) *elegans* and *Jania* sp. during May-July 1969 and January 1970.

Species of the family Corallinacea are widespread throughout the littoral area, forming an abundant element in the coastal marine flora. The substrate on which all littoral seaweeds in this area are attached is principally weathered Mesozoic greywacke and argillite with sorted pebbles, coarse-grained sands and fine silts deposited higher up by the breaking surf.

It was found that the safest method of sampling quantitatively was to collect the weed along with its substrate. This was done by placing a preserving jar with a mouth diameter of 3 inches over the algal tufts and quickly shattering the rock around the basal holdfasts, thus taking as much substrate as possible with the algae. In the laboratory 10% formalin was added to the jar and left for 15 to 20 minutes. The alga was then shaken to dislodge any clinging organisms. The fronds were examined under a stereoscopic microscope for any sessile fauna. The remaining animals were sifted, sorted, and stored in fresh 10% formalin.

MOLLUSCA

Three species of chiton were encountered. Both *Amaurochiton glaucus* and *Sypharochiton pelliserpentis* were found in the mid-littoral clinging to the substrate rock of the *Corallina officinalis* community. *Sypharochiton sinclairi*, however, was located wedged up against the holdfast of a tuft of *Cheilosporum corymbosum* in the sublittoral fringe. All 3 species occurred in both summer and winter samples.

The minute prosobranch molluscs were very numerous and constituted the greatest mass of all animals found in both mid-littoral and sublittoral samples. These small gastropods, commonly called "rissoids", crawled over the algal fronds feeding on the diatomaceous film. Ponder (1965) classifies these animals as "micrograzers and microdetritus feeders". The two major families to which these species belong are the Eatoniellidae and Rissoidae.

Identifications were made on shell characters alone, using Dr W.F. Ponder's type material as a comparative source.

By far the most abundant rissoid was *Eatoniella olivacea* which was found in very large numbers, especially on the mid-littoral algae. They were significantly less numerous, as were most other species, in the lower more exposed areas.

Eatoniella olivacea, *E. mortoni*, *E. delli*, *E. atervisceralis*, *E. albocolumella*, and *E. bathami* were all replaced in the sublittoral samples by *E. notalabia*, *E. lutea*, *E. limbata*, and *Skenella pfefferi*. *E. lampra* was found primarily beneath the substrate stones in the upper littoral pools.

None of the other gastropods found in the mid-littoral area were found in sublittoral samples except for small numbers of *Zalipais lissa*, *Incisura lytteltonensis*, *Rissoella micra*, *Rissoa latimbrata*, *Notoscorbs incidata maoria*, *Estea rekohuana*, and the larger cantharid *Micrelenchus sanguineus* which is more common on the surrounding kelp blades. The catseye, *Lunella*

A NEW SHELL JOURNAL

Mr Elwyn Richardson, the noted educationalist, has launched what is quite a surprise on the New Zealand - a new conchological publication AND a new society!

It is the *Proceedings of the Taupaki Malacological Society*, of which Volume 1 Number 1 was issued on 1 May 1997. This 26-page first number contains a single paper - "Further molluscan records from the Te Piki Member, Cape Runaway, with the descriptions of two new species". From this site, on the roadside about 7 km east of Cape Runaway in the eastern Bay of Plenty and made known by Powell in 1934 and further by Grant-Mackie & Chapman-Smith in 1971 (based also on extensive collecting by Bruce Marshall), 242 species of molluscs have now been identified, of which all but 5 (apart from 43 fossil members) are recorded as still living in the Aupourian marine province. The dating of this deposit is in the Lower Hawera Stage, some 340,000 years ago. Five new species are included in this report: 2, a rissoid *Attenuata admiranda* n.sp. and *Liacraea opimacosta* n. sp. (Conidae: Mangellinae), both fully illustrated and described; 2, unnamed but described in the genera *Ledella* and *Neoguraleus*, 1, *Obexomia* n. sp., listed only. Margaret Morley has provided some notes on *Taranis bicarinata* (Suter) and *Lucernapex angustata* (Powell). As a one-time deepwater oceanographer I found the discussion as to what constitutes "deep water" rather novel. Traditionalists will deplore the publication of new species descriptions in what is nominally a publication of limited distribution. However, provided the following moves are done, no great problem exists as to its status or availability: the International Rules of Zoological Nomenclature are complied with (as they appear to be) and copies of the publication are lodged in the key resource libraries (such as The Natural History Museum in London, the National Marine Biological Library at Plymouth, the British Library, The Australian Museum, the Library of Congress, the National Museum of Natural History in Washington, D.C.) and with abstracting organisations such as Biosis and ASFA, as well as main libraries within New Zealand (the publication has an ISSN number so is readily retrievable and, anyway, is in Legal Deposit, Wellington, under the Copyright Act). The limited knowledge overseas (in my experience) of the existence of some of the New Zealand scientific periodicals which we know so well locally, such as the ex-DSIR journals and even the Royal Society of New Zealand's journal, is really just as surprising as this attempt to hoist a new means of disseminating knowledge, so good luck to its originator! We welcome your effort. Further comments on its advent and a technical review of its contents have already been made by Professor Jack Grant-Mackie in the latest issue of the *Newsletter of the Geological Society of New Zealand* (No. 114, November 1997, at pp 84-85).

This issue has been published in an edition of 250, and copies can be obtained by sending a large stamped addressed envelope to Mr Richardson at: 188 Hunters Road, Taupaki, Henderson RD 2D. I do not know how one becomes a member of the Taupaki Malacological Society itself.

E. Dawson

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